

**WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY**  
**Contract No: DAAD19-02-D-0001/ Delivery Order 0456 with Battelle Columbus**  
**Operations for the U.S. Army Environmental Policy Institute**

**Summarizing Environmental Security Monthly Scanning**  
**July 2006—June 2007**

The purpose of the monthly scanning reports is to assess worldwide environment-related events in order to identify and analyze issues that might trigger future international environmental regulations and/or modifications to the existing ones with potential implications for the military.

Environmental security continues to move up on national, regional, and international agendas due to increasing scientific evidence of climate change, extreme weather events, the number and intensity of natural disasters, pollution, potentials for pandemics, and nuclear-biological-chemical threats. The *Army Strategy on the Environment* reflects this new direction.

Calls for improving international environmental governance are increasing. The technological ability to identify environmental threats and crimes is becoming cost-effective through new sensors and communications. The UN Security Council and other international bodies are expected to pay more attention to problems of environmental security. Environmental damages that people and organizations got away with in the past are less likely to escape detection and punishment in the future.

Environmental diplomacy is increasingly being used to support conflict prevention efforts and to build international confidence, while human security is gaining recognition in both military and diplomatic circles. Environmental security is a link between the two.

The Millennium Project defines environmental security as environmental viability for life support, with three sub-elements:

- preventing or repairing military damage to the environment,
- preventing or responding to environmentally caused conflicts, and
- protecting the environment due to its inherent moral value.

This summarizing paper presents the events and emerging environmental security-related issues identified since June 2006, organized around this definition.

Over 200 items have been identified during the past year and about 900 items since August 2002 when the Millennium Project has began this monthly scanning. All the items and their sources, organized by the month when they were identified, are available on the Millennium Project's Web site, <http://www.acunu.org/millennium/env-scanning.html> and the version with Military Implications is available on the AEPI web site <http://www.aepi.army.mil/rpt-weei.html>.

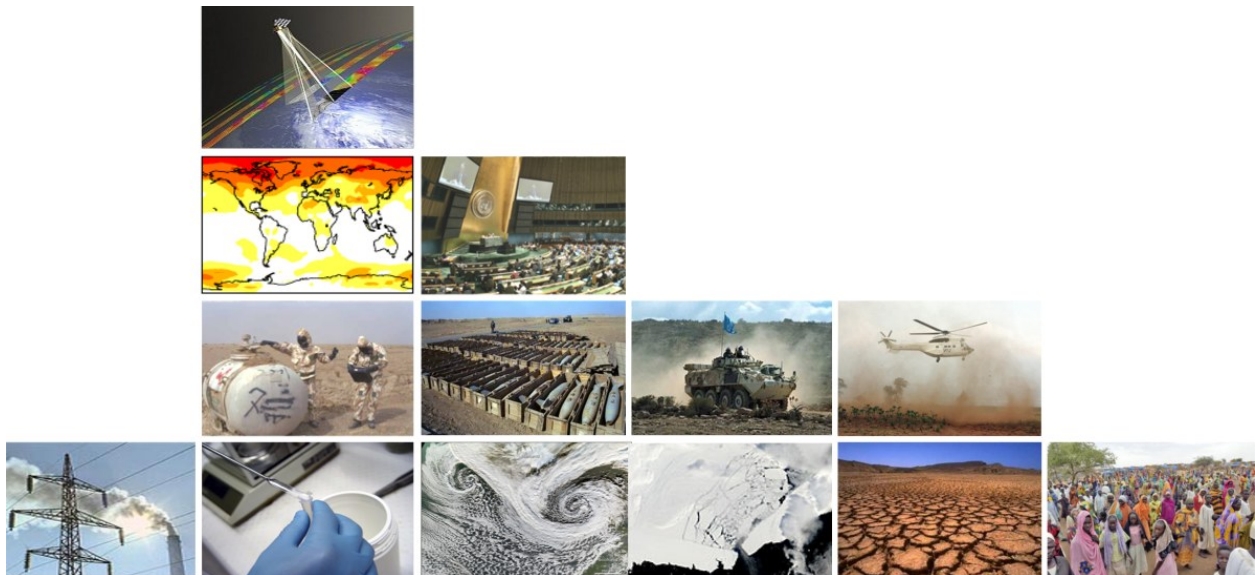
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# TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY.....</b>	<b>3</b>
<b>1. ENVIRONMENTAL SECURITY MONTHLY SCANNING ITEMS.....</b>	<b>16</b>
1.A Preventing or repairing military damage to the environment	
1.B Preventing or responding to environmentally caused conflicts	
1.C Protecting the environment due to the moral value of the environment itself	
<b>2. MILITARY IMPLICATIONS AND SOURCE.....</b>	<b>106</b>

*In coming decades, changes in the environment—and the resulting upheavals, from droughts to inundated coastal areas—are likely to become a major driver of war and conflict.*

UN Secretary-General Ban Ki-moon  
 “Global Warming: Confronting the Crisis” Conference  
 New York, March 1, 2007



## **EXECUTIVE SUMMARY**

Over the past several years, with support from the U.S. Army Environmental Policy Institute, the Millennium Project has been scanning a variety of sources to produce monthly reports on emerging environmental issues with potential security or treaty implications. Over 200 items have been identified in the period July 2006–June 2007 and about 900 items since this work began in August 2002.

### **General Patterns and Insights**

National and international security implications of climate change and environmental degradation are increasingly acknowledged in official forums by governments, corporations, NGOs, academic institutions, and international organizations as needing strategic interventions to prevent conflicts.

Increasing scientific evidence of global warming, extreme weather events, and the number and intensity of natural disasters have triggered new regulations to reduce greenhouse gas emissions, better monitoring systems and models, and strategies to develop systems for early warning, mitigation, and adaptation to cope with climate change effects. Without more serious mitigation and adaptation measures, mass migration and conflicts seem inevitable due to climate change, falling water tables, and other contributing environmental factors.

There is no adequate international system or framework to cope with environmental refugees, estimated to reach 50 million by 2010 and 200 million by 2050.

Environmental issues are a “threat multiplier.” Most conflicts are occurring in the least environmentally sustainable regions, thus reinforcing the idea that environment and conflict should be addressed simultaneously and that one aggravates the other.

The increasing ratification of multilateral environmental agreements and the adoption of ISO 14001 standards are improving environmental management globally. The time between the design of an MEA and its coming into force as well as the time it takes to reach a high ratification level are shortening considerably. International attention is shifting from designing new MEAs to improving the effectiveness of existing agreements.

MEAs often conflict with national economic or political interests, generating issues of noncompliance with international treaties, lack of cooperation with international organs, and deadlock in many international treaty–related negotiations. Matters of disagreement are mostly related to strategies for greenhouse gas emission cuts, nuclear non-proliferation, addressing security aspects of environmental implications, and outer-space security issues.

Efforts are increasing to strengthen international environmental governance by improving institutional structures, interlinkages among treaties, instruments to improve implementation, and international guidelines and frameworks for environmentally sound management.

The number, precision, and breadth of analytical tools to measure environmental change are improving rapidly.

New international watchdog bodies have been created and others proposed to assist legal actions against environmental crimes.

Since richer countries export polluting industries to poorer countries, there are economic incentives not to change environmental policies; hence, more serious incentives are needed to persuade developing countries to adopt environmentally friendly practices. However, international pressure to change seems inevitable, considering the size and impact of large countries like India and China.

More cooperation is occurring among a variety of institutions for better, more synergistic environmental policy and activities, which expands the scope of environmental considerations among a broader set of actors and the public.

There is a trend toward adopting the precautionary principle versus reactive actions.

The number, extent, and scope of ecologically protected marine and land areas are expanding.

Stronger international and interinstitutional coalitions and frameworks are needed to counter global environmental crime, such as illegal trade in hazardous wastes, smuggling proscribed hazardous materials, and exploiting and trafficking protected natural resources.

The accelerating rate of technological change has fundamentally changed the spectrum of threats to the environment and human health, such as e-waste, possible risks of using nanotechnology and biotechnology, use of chemicals, and the spread and safety of nuclear, chemical, and biotechnology labs.

Although space technology enhances Earth surveillance, provides early warnings of natural disasters, improves compliance mechanisms, and increases understanding of space and Earth phenomena, local on-the-ground coordination and applications are still deficient.

Work is under way to develop a global system for countering pandemics from either natural or terrorist causes.

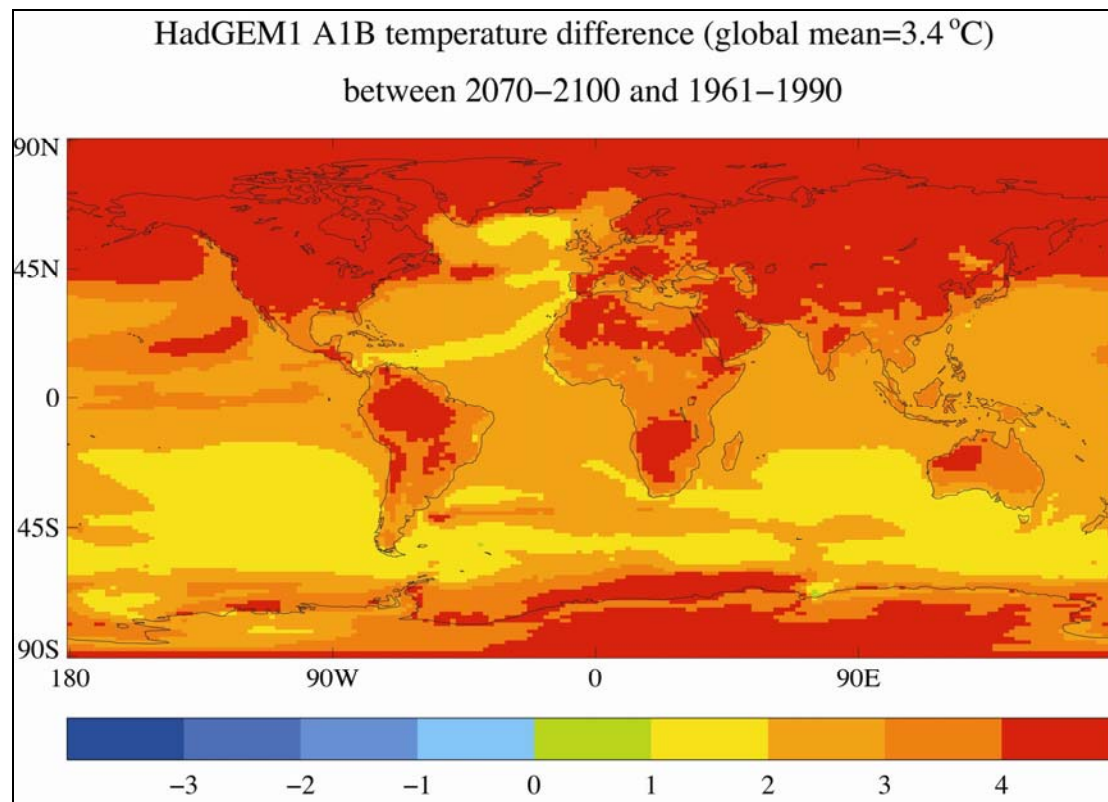
The costs are falling for nanotech environmental sensors, which can be connected to global information systems via satellite, potentially making environmentally damaging actions known instantaneously and worldwide.

ICT and robotics, new detection and cleanup techniques, and more environmentally friendly warfare contribute to reducing the military environmental footprint.

Militaries are increasingly called upon to assist in environmentally related issues, such as natural disasters or conflicts triggered by or affecting the environment, MEA enforcement, and reduction of their own environmental impacts.

Europe continues to lead in implementation of environment-related regulations and the design of new ones. It also began a revision of environmental regulations in order to make them easier for implementation and enforcement. The European Commission intends to introduce criminal sanctions for serious environmental offenses.

Environmental security analysis should include the impacts of new kinds of weapons; asymmetrical conflicts; increasing demands on natural resources; urbanization (which makes more people dependent on vulnerable public utilities); impacts of environmental degradation and climate change; continued advances in environmental law, with escalating environmental litigation; and the globalization that is increasing interdependencies.



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### **Preventing or Repairing Military Damage to the Environment**

The UN reports that about half of all conflicts over the past 20 years were “re-conflicts”—conflicts that recurred within five years of peace accords. Many had environmental backgrounds. Environmental degradation and hazardous ordnance leftovers in post-conflict areas threaten the livelihoods and health of current and future generations and may constitute an impediment for lasting peace. There should be a “green chapter” in the Geneva Conventions for safeguarding the rights of the environment.

The military will increasingly take part in post-conflict reconstruction efforts and environmental restoration to build stability, as well as in mitigation of environmental effects to avoid conflict. Thus environmental aspects have to be seriously considered in military planning and post-conflict activities. A UK Ministry of Defence report identifies potential risks from nanotechnology, chemical weapons from World War II, risks from military sonar, and tungsten and its alloys as emerging sustainability issues related to military activities, and the Ministry acknowledges the link between conflict, security, and sustainable development.<sup>1</sup>

In April 2007 the UN Security Council debated the security implications of environmental factors for the first time in its history. Some countries argued that the Security Council is not the right forum for this. The EU, Peru, Panama, and Papua New Guinea (head of the Pacific small island states) were among the supporters of the initiative. “The dangers that the small island states and their populations face are no less serious than those nations threatened by guns and bombs,” stated Ambassador Robert Guba Aisi of Papua New Guinea.

A group of high-ranked U.S. military officers and national security experts, discussing the direct impact of some aspects of climate change on military systems and operations, warns that “climate change could seriously exacerbate already marginal living standards... causing widespread political instability and the likelihood of failed states.... The chaos that results can be an incubator of civil strife, genocide, and the growth of terrorism.”<sup>2</sup>

New national initiatives increasingly include the military for environmental protection, mitigation (after natural disasters), prevention, and preparedness, as well as assistance in compliance with international agreements.

Many post-conflict health and environmental impact assessments are ongoing, as are liability disputes. Protocol V on Explosive Remnants of War (ERW) of the Convention on Certain Conventional Weapons came into force in November 2006, almost three years after it was adopted. The Protocol stipulates that Parties should take “remedial measures to mark and clear, remove or destroy unexploded ordnance or abandoned explosive ordnance” as early as possible after hostilities have ended, whether they control the territory or not, by cooperating directly or indirectly with all parties involved through quick and accurate information exchange. The Protocol is not retroactive. The Portfolio of Mine Action Projects 2007 found that 26 out of 29 war-ravaged countries or territories surveyed are beleaguered with the lurking remnants of cluster bombs and other explosives. Unexploded ordnance is the focus of the Projects in 2007 to deal with the aftermath of conflicts that took place before Protocol V entered into force.

There is a proposal to develop a legally binding international instrument by 2008 to ban cluster munitions and to create a framework for dealing with the consequence of cluster munitions’ use, due to environmental damage and civil casualties. Several countries already have regulations to limit the production, use, sale, or transfer of cluster bombs.

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<sup>1</sup> *Sustainable Development Report 2005*. UK Ministry of Defence, September 2006.

<sup>2</sup> *National Security and the Threat of Climate Change*. CNA Corporation, 2007.

Some experts argue that “nonlethal” materials such as “incapacitating agents” are toxic chemicals that would violate the CWC if used on the battlefield. Clarification of what chemicals will be allowed under the treaty’s exception is needed.

“The biological weapons threat is multiplying and will do so regardless of the countermeasures we try to take,” warns Steven Block, a Stanford University biophysicist and former president of the Biophysical Society. The likelihood of SIMAD (Single Individuals Massively Destructive) is increasing every day. There is no monitoring of the expanding gene-synthesis industry, and the supervision of controversial experiments is voluntary and irregular at universities and private laboratories around the world. Although scientists are still arguing about what approach would be the best to increase protection against bioterrorism and new kinds of synthetic bioweapons, they do agree on the need for swift and intensified international control to impede the accidental or deliberate release of genetically modified organisms.

In order to prevent the misuse of science, it is important to strengthen the scientific expertise of security organizations and to create an independent science and technology advisory committee for intelligence agencies, as well as to promote within the international scientific community a common culture of awareness and responsibility. UNESCO has issued a draft declaration that sets universal ethical guidelines for governments to consider ethical and human rights in science and technology policymaking. Standards are needed for new technology-related product development, diagnostics, therapeutics, and reagents, as well as for handling protocols.

New measures to improve nuclear, biological, and chemical weapons countermeasures include:

- adoption of amendments to the Convention on the Physical Protection of Nuclear Material;
- the International Convention for the Suppression of Acts of Nuclear Terrorism, which entered into force in July 2007;
- the recommendation for a biosecurity watchdog and codes of conduct for scientists;
- the International Strategy for Chemicals Management, adopted in February 2006; and
- continuous assessment of existing regulations.

The IAEA is building a global network for monitoring nuclear facilities by using direct satellite information to enhance the possibility of real-time tracking of sensitive nuclear materials and checking that they are not being diverted for nonpeaceful uses.

Several scientists and environmental groups claim that underwater sonar to detect submarines interferes with the ecolocation system of whales and dolphins, sometimes causing mass strandings. The U.S. government approved a budget to research the effects of military sonar systems on whales and dolphins, as well as the development of electronic systems to detect the presence of marine mammals in naval training areas.

Conflict and environmental degradation exacerbate each other. Arab countries are among the least environmentally sustainable in the world. According to the Environmental Sustainability Index of Yale University, Iraq, Sudan, and Kuwait fall within the bottom 5% of the world for sustainability, and half of the remaining Arab states scored in the lowest 25%. Without major changes, environmentally induced migrations and more conflicts in the region seem inevitable. The current wars are making this situation worse. The Hezbollah-Israeli war had a devastating



national and regional environmental impact. The oil slick caused by Israeli bombing of the Jiyeh power station affected some 150 kilometers of Lebanese and Syrian coastline, and the cleanup could take up to one year with an estimated cost of over \$64 million. Massive damages to the ecosystem are already noticeable. The environment has a crucial role to play in Sudan's future peace and prosperity strategy, says UNEP. The Capacity Building for Environmental Governance in Sudan program will cover the period 2007–09.

New technologies are offering improved detection, cleanup, monitoring, and surveillance possibilities. WHO is developing a global epidemic simulator based on the model of climate monitoring systems. Small robotic helicopters operated by radio control could be used for reconnaissance and surveillance. High-sensitivity portable chemical and biological devices offer high accuracy detection, monitoring, and cleanup possibilities with rapid response time.

### **Preventing or Responding to Environmentally Caused Conflicts**

Climate change has increased environmental attention beyond just ecological, energy, and economic concerns to national and international security considerations. The UN Office for the Coordination of Humanitarian Affairs notes that over the past 30 years the number of storms, droughts, and floods has increased threefold while the number of people affected by disasters has increased fivefold. Former UN Secretary-General Kofi Annan warns that “environmental degradation has the potential to destabilize already conflict-prone regions, especially when compounded by inequitable access or politicization of access to scarce resources.”<sup>3</sup>

Recent research shows that climate change is happening faster and could be far worse than previously expected. Advanced computer modeling forecasts that by the century's end, the planet will face more weather extremes such as deadly heat waves, prolonged drought, and intense rainstorms due to global warming caused by human emissions of greenhouse gases. Scientists emphasize that extreme scenarios—as effects of climate change—should be integrated into the decision-making process. Most of the countries with the highest birth rates are those already affected by the world's worst wars. Growing pressure of people on land and resources is likely to exacerbate conflict in those areas. Most of the population growth will continue to be in already densely populated developing countries like India and China. And by 2025, the coastal population worldwide will increase by 35%, to 2.75 billion people living within 60 miles of an ocean. They will therefore be increasingly vulnerable to disasters resulting from climate change and rising sea level.

Although research shows serious uncertainty concerning sea level rise forecasts, there is compelling evidence that shore communities are at risk. Estimates of sea level rise by 2100 due to global warming vary from the 9–88 centimeters projected by the IPCC to as much as 140 centimeters. Although it is difficult to predict melting in Greenland and Antarctica, researchers note that these areas hold enough water to make sea levels rise by 70 meters.

The Sundarban islands—off the Bangladeshi and Indian coast—are among the first inhabited islands already disappearing due to rising seas and erosion, threatening nearly 100,000 people

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<sup>3</sup> Progress report on the prevention of armed conflict. Kofi Annan, 2006.

who will have to be evacuated over the next decade. Many Tuvaluans are also leaving their Pacific island homes and moving to safer ground in New Zealand, thus officially becoming environmental refugees. In late 2005, over 100 villagers of the Pacific island Tegua, in Vanuatu, were relocated to higher ground to be protected from aggressive storms and waves. The move, carried out under the Capacity Building for the Development of Adaptation in Pacific Island Countries, might represent the first example of formal mass displacement as a result of climate change.

Whole island nations—from the Maldives to the Marshall Islands—vast areas of countries from Bangladesh to Egypt and to Alaska, and many coastal cities are at risk as sea levels continue to rise, threatening the culture and the very survival of the inhabitants. Experts warn that in addition to the South Pacific low-lying islands that are already affected, millions of people in densely populated countries such as Bangladesh and parts of China, Indonesia, and Vietnam might be forced to move by rising sea levels.

The UN estimates that by 2010 there might be 50 million climate refugees, while Christian Aid estimates that over the next 50 years 1 billion people might be forced to migrate, mostly as a consequence of environmental conditions. The vast majority will be from the world's poorest countries—the Sahara belt, South Asia, and the Middle East. It estimates that in 2007 there are 25 million people displaced by conflict and human rights abuses, 25 million by natural disasters, and 105 million by large development projects, with 8.5 million now officially recognized as refugees. By 2050, some 250 million people could be permanently displaced by climate change-related phenomena. Janos Bogardi, director of the UNU Institute for Environment and Human Security, called for the UN to create a legal framework to address future environmental refugees' situation, while taking into account fears that by including environmental migrants in the international legislation protecting refugees, "we are weakening one of the strongest tools for protecting refugees." Hence, the UN "should find other means of helping environmental migrants." He also emphasized that environmental factors often lie at the root of more obvious causes of migration.

The thawing of Arctic sea ice opens up the Northwest Passage as an international shipping route, triggering international disputes over sovereignty and ecological implications. In addition to a potential sailing route, opening the Northwest Passage provides an opportunity for access to rich resources, including oil. Research suggests that the passage could become ice-free and opened for navigation as soon as 2015. Although scientists, politicians, and environmental activists are increasingly warning about the complexity of the problem, no international regulations are yet in place for this fragile region. While Canada claims sovereignty over the region, it is at odds with other countries, including the U.S., Denmark, and Russia, which argue that the area is international waters or a continuation of their territories.

Water tables are falling on all continents; 40% of humanity depends on watersheds controlled by two or more countries, thus conflicts are likely to be exacerbated unless integrated cross-border water management systems are implemented. The International Water Management Institute notes that while over the past 100 years water usage increased six fold, it is expected to double again by 2050. Today water scarcity affects 700 million people around the world; by 2025, this could rise to more than 3 billion. The IPCC report *Impacts, Adaptation and Vulnerability*

forecasts that “hundreds of millions of Africans and tens of millions of Latin Americans who now have water will be short of it in less than 20 years. By 2050, more than 1 billion people in Asia could face water shortages.” Green Cross International renewed its call for the adoption of an international legal instrument that would assure the right to water.

Extreme drought might affect 10% of world land by 2050—five times more than now—and by the end of the century the figure might be 30%, estimates the UK Met Office Hadley Centre. The year 2006 was the International Year of Deserts and Desertification, and the UNEP Governing Council recommended that 2010–20 be declared the UN Decade for Deserts and the Fight Against Desertification to increase efforts to explore ways to cope, counter, or even reverse these phenomena. The southern progression of the Sahara increases famine and migration, escalating the risk of conflicts across Africa.

The increased number and intensity of natural disasters triggered the building of a global early warning system. The Indian Ocean tsunami warning system was declared operational in July 2006, but local coordination is still lacking. The tsunami that struck Indonesia on July 17, 2006, affected more than 54,000 people (killing 550) because no warning was issued to the population. The UN International Strategy for Disaster Reduction system provides a global framework for disaster reduction and recovery. The first session of the multistakeholder Global Platform for Disaster Risk Reduction, held in June 2007, focused on strategies for systematic implementation of the Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters. The Global Facility for Disaster Reduction and Recovery, set up in cooperation with the World Bank, plans to improve preparatory and recovery actions to lower the risks and consequences of natural disasters by considering disaster risk reduction a priority in development projects in countries at risk. The World Bank Global Hotspots Study identifies 86 vulnerable countries with risks of high mortality and economic loss.

The IEA’s *World Energy Outlook 2006* names two major issues facing the world over the next 24 years: the threat of “insecure” and “inadequate” energy supplies at reasonable prices and environmental damages caused by increasing energy demands. Growing energy demand might become a driving force for some countries to disregard international security issues and accords to the point of jeopardizing international security.

Waste management is not just an environmental issue, it is also a security concern. The scandal around the dumping of toxic waste at Abidjan, Côte d’Ivoire, has intensified the global debate concerning trade in waste and the adequacy of the Basel Convention. Some African and Asian countries became dumping grounds for hazardous waste, such as radioactive uranium waste, lead, cadmium, mercury, industrial and hospital chemicals, and a rising volume of electronic waste. Although the Basel Convention and its 1995 amendment ban the dumping of toxic waste in countries without proper facilities for handling it, the process continues illegally in countries that are not party to the Convention. In addition to environmental and health consequences, a Senegalese ecologist points out the security issues: “The waste is often accepted by corrupt people or factions who want money to buy weapons.”

Although climate change is recognized as one of today’s most important threats to world security, contributions to the two funds specifically designed to help poor countries adapt—the

Least Developed Countries Fund and Special Climate Change Fund—totaled just \$43 million in 2005–06, while it is estimated that the overall annual costs to adapt to projected climate change are likely to be between \$10 billion and \$40 billion per year. Meanwhile, in 2006 the world spent \$1.2 trillion on weapons and \$1.5 trillion on oil, while the subsidies to fossil fuel industries amount to over \$235 billion per year.

### **Protecting the Environment Due to Its Inherent Moral Value**

WWF and the Global Footprint Network report that humanity's impact on the planet has more than tripled since 1961 and that Earth's resources are being used faster than they can be replaced by nature.<sup>4</sup> If present trends continue, by 2050 humanity will demand twice as much as the planet can supply. The Millennium Ecosystem Assessment reported that 60% of Earth's vital ecosystem services are being degraded or used unsustainably.

The Paris Call for Action proposed a Universal Declaration of Environmental Rights and Duties (the right to a sound environment) and the transformation of UNEP into the United Nations Environment Organization. Environmental degradation "could even come to jeopardize international peace and security" warned UN Secretary-General Ban Ki-moon, and UN General Assembly President Sheikha Haya Rashed Al Khalifa called for "clear objectives and strong ecological governance at the global level, a concept that continues to elude us."

There are more than 700 MEAs.<sup>5</sup> The focus of international negotiations is switching from designing new treaties to reinforcing existing ones and strengthening international environmental governance. Evaluations of the effectiveness of these agreements are improving. Nevertheless, noncompliance with international treaties and lack of cooperation with international organs, as well as deadlock in many international treaty-related negotiations, continue to be an international concern.

The 2007 UNEP Governing Council adopted decisions on issues related to strengthening international environmental governance (including the draft Environment Watch Strategy Vision 2020 and coordination and synergies among multilateral environmental agreements) and improving the assessment of the world environmental situation and mitigation actions. There are efforts for better integration of the existing MEAs that cover related issues, such as the Basel Convention on Waste and the Stockholm Convention on POPs for developing a framework for environmentally sound waste disposal.

The European Commission's three-year program to modernize EU legislation—as part of its commitment to simplify the EU system of rules—started with the environment-related sector, since it is the most heavily regulated. It also intends to increase the enforcement of environmental regulations by introducing criminal sanctions for serious environmental offences. The European Environmental Liability Directive came into force, establishing a comprehensive framework on liability for damage to the environment, based on the "polluter pays" principle.

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<sup>4</sup> *Living Planet Report 2006*. WWF and the Global Footprint Network, 2006.

<sup>5</sup> *GEO Year Book 2007*, UNEP, 2007.

Increasingly powerful analytic models and tools are being created to compare national environmental status. New international watchdog bodies have been created and others have been proposed to assist legal action against environmental crimes. For example, the Compliance Committee for the Kyoto Protocol has begun its operations, the Asian Regional Forum for combating environmental crime was formed, a global advisory group to address bio-threats was proposed, North America's Commission for Environmental Cooperation is increasing enforcement of environmental regulations and public participation, and in 2007 the EU Environmental Liability Directive came into force.

Some environmental agreements or laws recently adopted, strengthened, in negotiation, or proposed include:

- International Convention for the Suppression of Acts of Nuclear Terrorism (entered into force in July 2007)
- Protocol V on Explosive Remnants of War, part of the UN Convention on Certain Conventional Weapons (entered into force in November 2006)
- UN Agreement to Protect the World's Forests (adopted in May 2007)
- E-waste Declaration for Basel Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal
- Stockholm Convention evaluation mechanisms (adopted) and non-compliance ones (expected for 2009)
- A global ban on mercury (in negotiation)
- Legally binding international instrument banning cluster munitions and framework for dealing with the consequence of cluster munitions to be proposed by 2008
- Network of Marine Protection Areas, to be adopted by 2012
- Post-Kyoto negotiations
- Tougher regulations for mandatory emissions targets at country, regional, local levels
- Conventional light bulbs to be banned in many parts of the world by 2012
- European Environmental Liability Directive (came into force in April 2007)
- Registration, Evaluation and Authorization of Chemicals (REACH)
- Europe's chemical regulation (entered into force in June 2007)
- EU Restriction of Hazardous Substances Directive (RoHS) (came into force in July 2006)
- European Directive on Ship-Source Pollution (became effective in April 2007)
- Europe to begin penalizing jet pollution in 2011
- EU air quality directive for reducing pollution for fine dust particles (with effect from 1 January 2015)
- EU new regulations to combat surface water pollution
- Tougher European waste management strategy with reduction targets to 2008, 2012, 2020
- China e-waste rules
- Legislation to curb harmful ocean sounds (proposed)

The Basel Convention is one of the most reviewed treaties, as it is being adapted to the new waste types and management needs. Between 20 million and 50 million tons of e-waste are generated per year around the world. Approximately 100 million phones and 300 million personal computers might become waste by 2010. In the U.S., it is estimated that 14–20 million personal computers are thrown out each year; developing nations are expected to triple their output of all electronic waste by 2010. The December 2006 UN e-waste forum adopted the E-waste Declaration for Basel Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal, along with more than 30 decisions, including synergies and cooperation among the Basel, Rotterdam, and Stockholm Conventions. An international e-waste recycling system, along with transparent information and monitoring mechanisms to ensure accountability, is needed. Regional initiatives include the EC directive for e-waste management (Waste Electronic and Electrical Equipment), which came into effect in August 2005, and the Environmentally Sound Management of Electronic and Electrical Wastes program of action for the Asia-Pacific.

The European Parliament has voted for a tougher waste management strategy, which stipulates that EU production of waste should be stabilized at 2008 levels by 2012 and scaled back by 2020, requiring that 50% of municipal waste and 70% of industrial waste be recycled by 2020. Although the new directive would not impose firm obligations on member states, it would establish a “general rule or guiding principle” influencing future waste management practices. However, EU member states have different waste management strategies and efficiency and are expected to fight the Parliament’s proposal.

The number of commercial chemicals is expected to grow 80% over the next 15 years. The International Strategy for Chemicals Management was adopted in February 2006; there are recommendations for a biosecurity watchdog and codes of conduct for scientists. Policymakers and experts reinforce the need for applying the precautionary principle in the context of chemical safety, for extending globally the regulations on heavy metals, and for tackling the widening gaps among countries in following chemical safety policies.

The number of studies on the environmental and health impacts of various forms of nanotechnology is increasing rapidly around the world. These will lead to new nanotechnology standards. China was the first nation to set standards. The International Organization for Standardization is in the process of developing standards, and the American Society for Testing and Materials issued its first standard on terminology for nanotechnology.

FAO has called for environmental risk assessment studies for biotechnology, with protocols and methodologies agreed at national and international levels. An independent investigating international commission and an international register for biotechnology-related incidents were proposed under the Cartagena Protocol on Biosafety.

Protected ecological sites are being suggested both for land and marine environments. Greenpeace is suggesting that 40% of the world’s oceans should be declared natural reserves and protected in the same way that land areas are. The UN notes that 0.6% of the oceans are protected compared with 12% of the world’s land. Pollution has led to about 200 marine “dead zones” or low oxygenated areas, reducing fish stocks and the livelihood of people who depend

on fisheries. An estimated 16% of the world's coral reefs suffered up to 90% mortality. A roadmap was launched in 2007 to meet the goal of establishing a network of marine protected areas by 2012.

Some scientists believe that the dynamics causing global warming have reached the point beyond human ability to stop climate change. There is growing debate about how to make post-Kyoto strategies more inclusive and fair. One idea is establishing global per capita carbon emissions targets. G-8 leaders agreed to seek “substantial” cuts in greenhouse gas emissions and to reach consensus on a new—more inclusive—UN-led greenhouse gas emissions agreement by 2009. Many countries support a target of a 50% cut of 1990 emissions level by 2050. Australia is seeking to launch negotiations for a new Asia-Pacific climate agreement that would include emerging high emitters such as China and India.

New proposals for emissions reduction strategies and targets are increasing. The EU's new Energy Policy stipulates that CO<sub>2</sub> emissions should be cut by 20% from 1990 levels by 2020—a target that could rise to 30% if the U.S., China, and other economic powers agreed to comparable reductions. Britain might become the first country to limit greenhouse gases by law. The EU and the U.S. government created committees to address climate change and energy security issues. Norway hopes to become the world's first “carbon neutral” country by reducing its emissions to zero by 2050. Meanwhile, countries and local governments are increasingly adopting regulations for phasing out inefficient incandescent lighting.

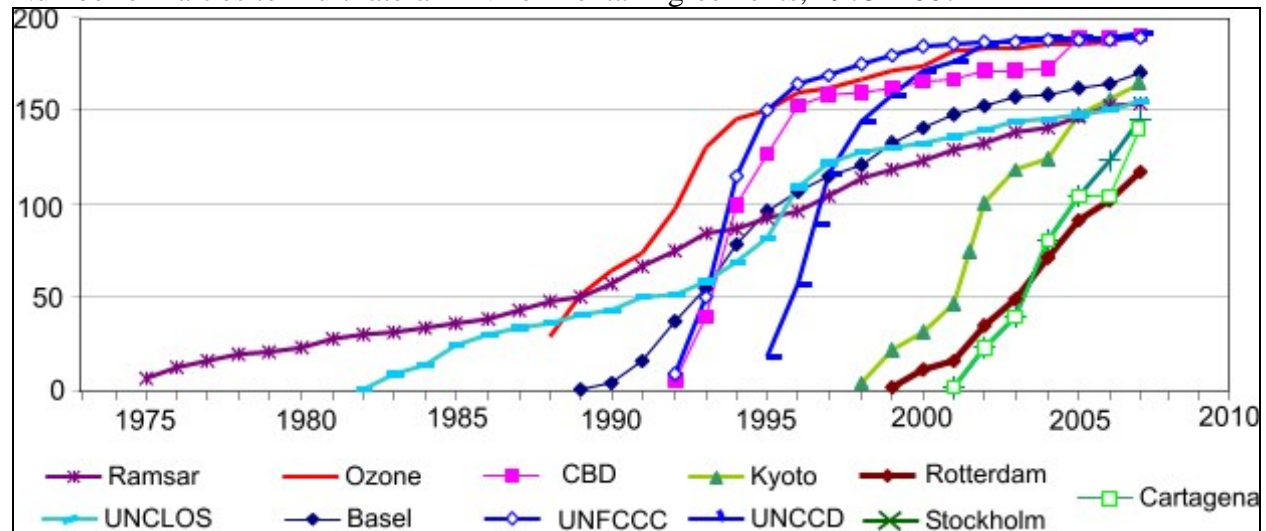
Space observations have become a major tool for monitoring environmental change, helping policymaking develop adequate strategies, and assisting in the enforcement of environment-related regulations. The ESA Globwetland project supports the Ramsar Convention on Wetlands. The Global Monitoring for Environment and Security system aims to provide the public, policymakers, and decisionmakers with essential strategic environmental and civil security information based on operational and integrated space, air, ground, and sea observations. The Health Early Warning System will improve warning and emergency response in case of natural disasters and pandemics by using satellite communication. The International Charter “Space and Major Disasters” is a network of international, private, and government space agencies that aims to provide satellite data free of charge in emergency situations to those affected by disasters anywhere in the world. Some 41 nations own satellites. Since there is no mechanism to address space pollution events such as China's January 2007 anti-satellite test, some kind of anti-ASAT debris creating treaty seems necessary, possibly drafted by the Inter-Agency Space Debris Coordination Committee in Vienna.

A growing number of industries and local governments are developing appropriate environmental and energy policies and regulations in the absence of national leadership. In many cases these are based on international standards or agreements. Civil society in some countries is increasingly involved in the design of local and regional regulations, in many cases with the help of international NGOs.

The *Cleantech Report*<sup>TM</sup> by Lux Research notes the expansion of cleantech innovations: 1,500 cleantech start-ups operate worldwide, and 29,874 cleantech-related scientific journal articles were published in 2006.

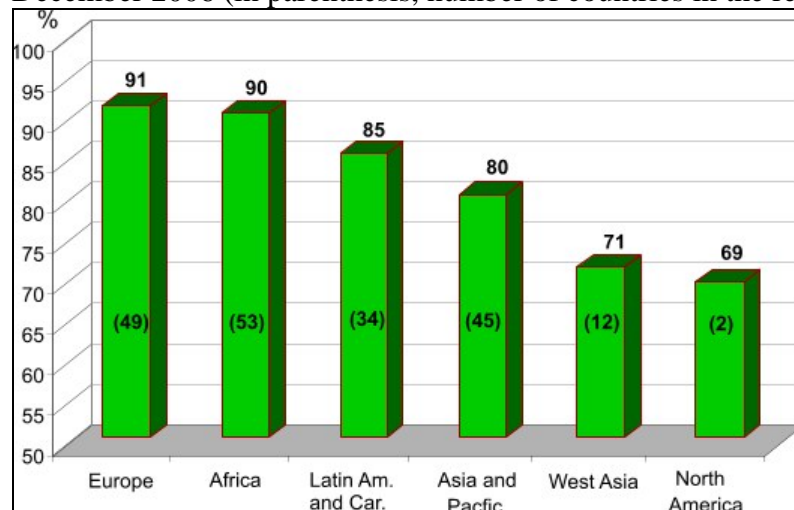
Alliances continue to be created among private companies, governments, NGOs, and international organizations to increase national and international eco-efficiency and environmental performance. Examples of these include the Principles for Responsible Investment, which reached \$8 trillion at its first-year anniversary; the American States initiatives to fight pollution at the state level; the Asia-Pacific Partnership; and the Urban Environmental Accords—a municipal version of the Kyoto Protocol.

Number of Parties to Multilateral Environmental Agreements, 1975–2007



Source: UNEP GEO Data Portal, with updates by the Millennium Project

Ratifications of 14 Multilateral Environmental Agreements, by UNEP GEO Region, as of December 2006 (in parenthesis, number of countries in the region)



Source: UNEP GEO Data Portal



# 1. Environmental Security Monthly Scanning Items

## 1.A PREVENTING OR REPAIRING MILITARY DAMAGE TO THE ENVIRONMENT

### **Environmental Security Rises on the International Political Agenda.....23**

UN General Assembly 61st Session Pinpoints Global Warming as a Central Issue for Security  
UN Conflict Prevention Strategy Includes Environmental Dimension  
UK Initiates UN Security Council Debate on Climate Change and Security  
UN Security Council Adds Natural Resources Management and Environmental Issues to  
Future Peacekeeping Missions  
New UN Secretary-General Announced Climate Change a Top Priority  
UN Appoints Special Envoys for Climate Change  
UNEP Governing Council/Global Ministerial Forum Makes Progress on Global  
Environmental Governance  
Controversy over a United Nations Environmental Organization Continues  
OSCE to Develop an Environmental Security Strategy  
UK Defence Ministry Highlights the Link between Environment and Security  
Civil Society Regional Consultations Worldwide Prior to the Global Ministerial  
Environment Forum  
UK Scientists List 100 Most Vital Ecological Policy Questions  
Environment a Key Element in the First European 18-month Work Program  
The Institute for Environmental Security in The Hague to Hold Annual Peace and  
Sustainability Sessions  
French President Jacques Chirac issues Paris Call for Action for Global Ecological  
Governance  
Climate Change a Serious Threat to Security, Conclude Eminent Military Officers  
Report on Environment, Security, and Sustainable Development  
New Environmental Security Blog

### **Conflict and Post-Conflict Environmental Security Issues.....28**

Protocol V on Explosive Remnants of War (ERW) of the Convention on Certain  
Conventional Weapons came into force on 12 November 2006  
Progress Made on Banning Cluster Bombs  
International Crisis Group to Debate Considering Climate Change Variable in Conflicts  
Hezbollah-Israeli War Threatens an Already Precarious Environment  
Environmental Legacy of Hezbollah-Israeli War  
Addressing Post-Conflict Environmental Security Issues  
Environment to Get Crucial Role in Sudan's Future Peace and Prosperity Strategy  
Report on Lebanon After-war Environmental Assessment  
Environmental Change and Security 12th Annual Report—Focus on Africa  
Environment and Security Initiative Progress Report 2006  
Japanese Chemical Weapons Cleaning in China Yet to be Completed

**National/Regional Environmental Strategies Affecting Military Activities.....32**

Pan-African Parliament Upgrades Environmental Policy  
Argentina Redeploys Military to Defend Water and Oil  
European Temporary Committee on Climate Change to Begin Operations in May  
U.S. Created Committee to Address Climate Change and Energy Security Issues  
Sustainable Development Strategies  
EU and US to Cooperate on Environmental Research  
Asia-Pacific Should Intensify Green Growth Efforts  
China Calls for Enhanced Cooperation on Environmental Protection in Northeast Asia  
The Disputes over the Northern Territories Set to Continue  
New Canadian Strategies for Monitoring the Northwest Passage  
China's Climate Change and S&T Action Plan  
China to Invest \$175 Billion in Environmental Protection over Five Years  
China Creates 11 Independent Environmental "Watchdog" Centers  
Ecuador Gets an Environmentalist Foreign Minister

**Technological Breakthroughs with Environmental Security Implications.....36**

Computer Technology and Robotics  
New Detection and Cleanup Techniques  
Space Technology for Environmental Security  
Technologies that Could Trigger New Forms of Arms Race  
Promising Environmental-friendly Technologies

## **1.B PREVENTING OR RESPONDING TO ENVIRONMENTALLY CAUSED CONFLICTS**

### **Migration Triggered by Environmental Causes.....48**

Climate Change Refugees  
Conference on Desertification Calls for Policies to Address Environmental Refugees  
Rising Sea Levels Claim First Inhabited Island and Threaten Coastal Populations Worldwide  
Increasing Weather Extremes and Environmental Refugees due to Climate Change  
Coastline Erosion due to Rising Sea Waters Signaled Around the World  
Economic and Security Implications of Climate Change  
Developing Countries Most Affected by Global Warming  
Population and Resources Affecting the Risk of Conflict

### **Food and Freshwater.....51**

*Living Planet Report 2006*  
Unless Water Management Improves, Conflicts over Water Are Inevitable  
Water Scarcity  
OSCE Environmental Security Conference Focuses on Land and Water  
Proposal for Recognizing Water as a Basic Human Right  
*Global Risk 2007*, the World Economic Forum  
*State of the World 2007: Our Urban Future*  
*GEO Year Book 2007*

### **Natural Disasters.....54**

Fourth Assessment Report Climate Change 2007  
International Early Warning Programme to Begin Operations  
Global Security linked to Climate Change  
Worldwatch Institute: Assessing the Relation between Disasters and Conflict  
Adaptation and Vulnerability Report by the IPCC  
Population Trends and Environmental Impact  
Indian Ocean Tsunami Warning System Declared Operational, but Local Coordination still Lacking  
Indian and Chinese Assessments of Climate Change Consequences  
China to Launch Climate Adaptation Program  
Indigenous Peoples Highly Vulnerable to Climate Change

### **Energy Security.....57**

*World Energy Outlook 2006* Warns on Energy Security and Environmental Implications of Increasing Energy Demands  
EU Energy and Climate Change Policy  
European Action Plan on Energy Efficiency  
China's Climate Change and S&T Action Plan

## **1.C PROTECTING THE ENVIRONMENT DUE TO ITS INHERENT MORAL VALUE**

### **Environmental Security-related International Regulations that Have Been or Are Close to Coming into Force since June 2006.....59**

REACH, Europe's Chemical Regulations Entered into Force on June 1, 2007  
Canadian Chemical Plan May Go beyond REACH as Environmentalists Get New Political Support  
Protocol V on Explosive Remnants of War (ERW) of the Convention on Certain Conventional Weapons came into force on 12 November 2006  
UN Nuclear Terrorism Convention Enters into Force on July 7, 2007  
European Environmental Liability Directive Came Into Force  
European Directive on Ship-Source Pollution Became Effective on April 1, 2007  
EU New Directive on Air Pollution  
Europe to Begin Penalizing Jet Pollution in 2011  
EU to Introduce New Regulations to Combat Surface Waters Pollution  
China Issues Electronic Waste Rules

### **Proposed Treaties and/or Changes to Existing Ones.....62**

#### **Toxic Waste Management**

UN E-Waste Forum and Basel Convention's Conference of Parties  
European Parliament Proposes Tougher Waste Management Strategy  
Toxic Waste Disposal of Global Growing Concern

#### **Chemical, Biological, Nuclear Safety**

UN Nuclear Terrorism Convention Enters into Force on July 7, 2007  
Stockholm Convention on POPs Adopts Evaluation but not Non-compliance Mechanisms  
Call for Reinforcements to Chemical Safety  
Eleventh Chemical Weapons Convention  
Better International Controls Needed to Prevent Bioterrorism  
Nuclear Nonproliferation Treaty Stalemate Continues

#### **Pollution and Greenhouse Gases**

2007—The International Year of the Ozone Layer  
Countries Contemplating Tougher Regulations for Mandatory Emission Targets  
UK Proposes Individual Carbon Trading

#### **Energy Saving**

Ban on Incandescent Light Bulbs Expands  
Compact Fluorescent Light Bulbs (CFLs) May Surge to Fore  
European Lamp Companies Push Compact Fluorescents, as Does the EU

#### **Post-Kyoto Protocol Negotiations**

UN Climate Change Conference Explores Post-Kyoto Regulations  
Moves Forward on the Post-Kyoto Negotiations  
Possible Tougher Policies Concerning Climate Change  
Clean Development Mechanism Successful

## Biological Diversity

- New Sites Added to World's Protected Biosphere Reserves
- New Strategy of UNESCO World Heritage Committee for Heritage Sites and Climate Change
- International Polar Year 2007-2008
- United Nations Agreement to Protect the World's Forests Adopted

## Marine Environment

- Political Agreement Reached on the European Marine Strategy Directive
- International Conference and Assessments Find Rising Ocean Pollution
- Commercial Whaling Ban Strengthened by International Whaling Commission (IWC)
- Roadmap for Establishing the Global System of Marine Protected Areas
- New Marine Protected Areas Proposed
- Malacca Straits Need Increased Protection from Various Security Threats
- Network of Marine Educators Formed to Protect Pacific
- Website for Marine Protected Areas and Cetaceans' Sanctuaries

## Heavy Metals

- Progress on Global Mercury Ban

## **Improved Compliance with Environmental Regulations.....73**

- European Environmental Liability Directive Came Into Force
- Environmental Crime Could Become a Felony in the EU
  - EU to Increase Environmental Regulations Enforcement
- North America's Commission for Environmental Cooperation to Increase Enforcement of Environmental Regulations and Public Participation
- Sixth Review Conference of the Biological Weapons Convention
- Kyoto/Climate Change
  - Law suits over Failure to Meet Kyoto Commitments
  - Global Warming Goes to Court
  - Global Division of Financial Responsibility for Global Warming Impacts

## **New Standards with Implications for Environmental Security.....75**

- Green Standards to Counter E-waste
- ASTM Issues Standard Terminology for Nanotechnology

## **Safety Issues.....76**

- Chemical, Biological, and Nuclear safety issues
  - Toxicogenomics Risk Assessment
  - New Concerns Rising over Chemical Weapons
  - Human Biomonitoring for Environmental Chemicals*
  - SIPRI Year Book 2007 Points out Environmental, Nuclear, and Energy Threats
  - Scientific Community's Questions Concerning Biodefense Standards
  - ETC Report Warns of the Threat of Synthetic Biology and Calls for Global Regulations
  - Russia's Floating Nuclear Plants Pose International Security Risk

Proceedings of the Workshop ‘Risk, Uncertainty and Decision Analysis for  
Environmental Security and Non-chemical Stressors’

Pandemics

Proposed Global Early Warning System for Monitoring Pandemics  
FAO Launched New Crisis Management Centre  
WHO-sponsored pandemic flu task force holds first meeting in Geneva

Potential Health and Environmental Threats of Some New Technologies

Nanotechnology  
    Research Matters  
    Reports  
    Conferences  
Electromagnetic Fields  
Sonar

**Pollution Issues.....92**

World Health Organization Stress Environmental Impact on Human Health  
New Predictions for the Atmosphere by 2030  
China’s ASAT Test Created Serious Long-Range Low-Earth Orbital Pollution  
Polluted Skies and Global Warming Puzzle Decoded  
European New Web-based Air Pollution Monitoring System  
Ozone Hole Worst Ever Recorded  
Mission to Study Arctic Environmental Changes  
Burning Fossil Fuels Acidifies Oceans, Erodes Coral Reefs  
New Research Finds Human Energy Usage is a Long-Term Heating Problem  
    Independent of Greenhouse Gases and Solar Radiation  
Accelerating Environmental Health Crises in China

**Climate Change.....96**

New Scientific Evidences  
    Global Warming and Extreme Weather Conditions  
    Greenhouse Gas Emissions  
    Melting Rate Increasing  
    Climate Models  
Climate Change Effects  
    Increasing Risk of Natural Disasters  
    Changes in Disease Patterns

**New Organizations with Mandates with eventual ES Implications.....103**

Global Facility for Disaster Reduction and Recovery to Mitigate Impact of Natural Disasters  
FAO Launched New Crisis Management Centre  
WHO-sponsored pandemic flu task force holds first meeting in Geneva  
UN Creates Secretariat of the Global Bioenergy Partnership at FAO  
‘3R’—Reduce, Reuse and Recycle New Environmental Think Tank for Asia  
Asian Consortium on Non-traditional Security Issues

UN StEP Initiative for Reducing E-Waste

**New Initiatives Aiming to Increase Eco-Efficiency.....105**

Switching to Green: A renewable energy guide for office and retail companies

*Cleantech Report™* by Lux Research

Idle Nighttime Computers Cited as Energy Wasters

## 1.A Preventing or repairing military damage to the environment

### ENVIRONMENTAL SECURITY RISES ON THE INTERNATIONAL POLITICAL AGENDA

#### UN General Assembly 61st Session Pinpoints Global Warming as a Central Issue for Security

Tackling climate change and environmental degradation were mentioned at par with terrorism, fair trade, HIV/AIDS, and human rights as essential issues to be addressed by global action by world leaders at the UN General Assembly, September 2006 Session 19-29. Since the small island developing states are particularly vulnerable to the impacts of global warming and sea level rise, they reiterated the call for renewable energy, a global fund to support these efforts, recognition of the “polluter pays” principle, and the placement of climate change in the center of development considerations. Some declared that the impacts of climate change are the most serious threat to global security. [September 2006. [Military Implications, Source](#)]

#### UN Conflict Prevention Strategy Includes Environmental Dimension

UN Secretary-General Kofi Annan’s Progress report on the prevention of armed conflict is an in-depth review of UN capacities to help prevent crises from escalating into armed conflicts; it outlines a wide range of recommendations to strengthen the UN’s conflict-prevention capacity around the world. Environmental factors are mentioned several times in this 54-page document; e.g., “Environmental degradation has the potential to destabilize already conflict-prone regions, especially when compounded by inequitable access or politicization of access to scarce resources.” (par. 22) The report will be submitted for discussion to the General Assembly on September 7, 2006. [August 2006. [Military Implications, Sources](#)]

#### UK Initiates UN Security Council Debate on Climate Change and Security

Britain’s foreign secretary argued that future climate change might cause wars: “An unstable climate will exacerbate some of the core drivers of conflict, such as migratory pressures and competition for resources,” and hence it is a matter for the UN Security Council to address. About 50 nations urged the UK to take the issue to the Council. During the debate on April 17, 2007, China argued against this position along with Russia, Qatar, Indonesia, and South Africa, saying that the Security Council is the wrong forum to discuss this and act on climate change-related issues. On behalf of 130 developing nations, Pakistan argued that the issue should be a matter for the UN General Assembly since it was a more democratic institution than the Council. [Yet it is the Council not the Assembly that can authorize peacekeeping forces.] Secretary-General Ban Ki-moon, acknowledging, “issues of energy and climate change can have implications for peace and security,” called for a “long-term global response” and noted, “this Council has a role to play in working with other competent intergovernmental bodies to address the possible root causes of conflict discussed.” The US supported the development of alternative fuels, energy efficiency, and other voluntary approaches that did not affect economic growth. The EU, Peru, Panama, and Papua New Guinea (head of the Pacific small island states), were among the supporters of the initiative. “The dangers that the small island states and their



populations face are no less serious than those nations threatened by guns and bombs,” stated Ambassador Robert Guba Aisi of Papua New Guinea. [April 2007. [Military Implications, Sources](#)]

#### **Britain to Push on Adding Climate Change to Security Council Agenda**

Britain intends to put climate change on the UN Security Council agenda in April—when it assumes the presidency. The intention is to stress that climate change is a matter of international security—from disputes over diminishing natural resources to mass migrations that could exacerbate conflicts. AIDS was similarly put on the Security Council agenda in 2001 and had positive results. Britain began lobbying the other 14 Security Council member states but seems to meet resistance from countries such as the U.S., China, and South Africa. [March 2007. [Sources](#)]

#### **UN Security Council Adds Natural Resources Management and Environmental Issues to Future Peacekeeping Missions**

A Security Council session dedicated to assessing the link between natural resources and conflict concluded that efforts should increase to improve natural resources management—mainly in failed or vulnerable states—so that their use contributes to post-conflict recovery, rather than fueling conflict. Monitoring and certification systems similar to the Kimberley Process Certification Scheme—concerning “conflict diamonds”—should be developed or emulated to stop illegal exploitation of resources, which triggers, exacerbates, or maintains conflict. The Council report added: In the case of peacekeeping and peacebuilding, the Council should ensure that the root causes of conflicts and the role of resources as a contributing factor were addressed in peace agreements as a way of ensuring that countries did not relapse into the vicious cycle of conflict. Therefore, in order to be more successful, peacekeeping operations should include an environmental and natural resources management dimension. [June 2007. [Military Implications, Source](#)]

#### **New UN Secretary-General Announced Climate Change a Top Priority**

UN Secretary-General Ban Ki-Moon took office on January 1, 2007 and listed addressing global climate change as a top priority during all of his major meetings, including his first press conference at the UN, his meeting with President George Bush, and public talks in Washington and with the EU leaders in Brussels. Climate change also topped the agenda of the World Economic Forum Annual Meeting at Davos, where Tony Blair said that addressing climate change was the “supreme expression of interdependence.” President Bush for the first time included the issue in his State of the Union address, the new Democratic leadership in the US Congress has it among its top priorities, and corporations are forming relationships with environmental groups. Hence, it is clear that the international politics of climate change could have dramatic changes over the next several years. [January 2007. [Military Implications, Sources](#)]

#### **UN Appoints Special Envoys for Climate Change**

As part of his commitment to enhance the UN's action in addressing climate change, Secretary-General Ban Ki-moon appointed three Special Envoys, former Norwegian Prime Minister Gro Harlem Brundtland, the President of the 56th Session of the UN General Assembly Han Seung-

soo, and former President of Chile Ricardo Lagos. The Special Envoys will work with the Secretary-General, government leaders, and key stakeholders from around the world to advance negotiations and develop mitigation strategies to address climate change and its impacts. [May 2007. [Military Implications, Sources](#)]

### **UNEP Governing Council/Global Ministerial Forum Makes Progress on Global Environmental Governance**

The 24th session of the United Nations Environment Programme (UNEP) Governing Council/Global Ministerial Environment Forum (GC-24/GMEF) took place 5-9 February 2007, in Nairobi, Kenya. Delegates from 141 countries discussed issues related to globalization and environment (including developing a range of clear and specific policy options for improving environmental governance at national, regional, and global levels), the state of the world environment, and cooperation at different international levels. The GC/GMEF adopted 15 decisions, including issues related to waste management (adequacy of the Basel Convention and eventual further developments), strengthening international environmental governance (including the draft Environment Watch Strategy Vision 2020, and coordination and synergies among multilateral environmental agreements), chemicals management (heavy metals and hazardous chemicals), the world environmental situation (improved assessment and mitigation actions), water policy and strategy, recommending that the UN General Assembly declare the decade 2010-2020 as the UN Decade for Deserts and the Fight Against Desertification, and Africa's environmental management and protection. Egypt offered to host an international center to build judicial capacity in environmental law. The next GC/GMEF will be held in February 2009. [February 2007. [Military Implications, Sources](#)]

### **Controversy over a United Nations Environmental Organization Continues**

Last February France along with 46 other countries proposed the establishment of a UN Environmental Organization to encourage and coordinate research and government actions to address climate change. During the Security Council's debate over security implications of climate change, Italy's deputy foreign minister, Vittorio Craxi, renewed support for creating a UN environmental organization. The U.S. affirmed support for strengthening the United Nations Environment Programme, but saw no need to create a new UN agency, arguing that the existing UNEP is sufficient for helping countries honor environmental treaty obligations. [See also *French President Jacques Chirac issues Paris Call for Action for Global Ecological Governance*, and *New International Strategy for Chemicals Management and 9th Special Session of the UNEP Governing Council*] [April 2007. [Military Implications, Sources](#)]

### **OSCE to Develop an Environmental Security Strategy**

The Economic and Environmental Forum of the Organization for Security and Co-operation in Europe (OSCE), held in May 2007 in Prague focused on constructive actions that would help its 56 participating States and 11 Partners tackle environmental security threats and promote stability. OSCE Chairman-in-Office, Spanish Foreign Minister Miguel Angel Moratinos said: "Environmental co-operation can be an effective catalyst for reducing tensions, broadening co-operation and promotion of peace." There was consensus that environmental security should top the Organization's agenda and the parties agreed to study the implications of climate change on security, the role of environmental sustainability, and how OSCE's actions could complement

other organizations' efforts. An Environmental Security Strategy for the Organization will be developed over the coming year and debated at the OSCE Ministerial Council to be held in November in Madrid. Several follow-up events to the environmental forum are planned. A resolution may be introduced in the OSCE Parliamentary Assembly to further support this governmental initiative to help insure its implementation under the next Chairman-in-Chief of the OSCE. [May 2007. [Military Implications, Sources](#)]

### **UK Defence Ministry Highlights the Link between Environment and Security**

UK Ministry of Defence published its second annual Sustainable Development Report. The 2005 report identified potential risks from nanotechnology, chemical weapons from the WWII, risks from military sonar, and tungsten and its alloys as emerging sustainability issues related to military activities; and most importantly, acknowledged the link between conflict, security and sustainable development. 'We must also be ready to act, anywhere in the world, where environmental, social or economic stresses may contribute to the destabilization of society... we have a significant role to play in helping to address these concerns and exploring links between security, conflict and SD with Foreign and Commonwealth Office and Department for International Development,' the report said (DFID). [For the first Annual report, 2004, See the item *UK Defense Ministry released its first Sustainable Development Report* in the August 2005 environmental security monthly report] [September 2006. [Military Implications, Sources](#)]

### **Civil Society Regional Consultations Worldwide Prior to the Global Ministerial Environment Forum**

In preparation for the 8th Global Civil Society Forum (GCSF) and the 24th session of the Governing Council/Global Ministerial Environment Forum (GC-24/GMEF) to be held in Nairobi, Kenya, in February 2007, representatives of major groups of civil society held regional consultations around the world. The European Regional Consultation took place in Geneva, October 23–25, and the African Civil Society meeting was held in Nairobi, October 26-27. The discussions were structured around the February GCSF's central themes—globalization and environment, and UN Reform—with focus on such regional aspects as water, chemicals management, sustainable procurement policies and practices, and international and regional processes. [October 2006. [Military Implications, Sources](#)]

### **UK Scientists List 100 Most Vital Ecological Policy Questions**

UK scientists have prepared a list of the 100 biggest questions facing the country's environment. According to Guardian Unlimited, "the list ... of Britain's most pressing ecological problems is based on the suggestions of more than 650 experts in universities, conservation groups and government institutes. It is intended to inform policy-makers and steer research over the next decade to answer key questions in areas such as farming, climate change, pollution and urban development." [August 2006. [Military Implications, Source](#)]

### **Environment a Key Element in the First European 18-month Work Program**

For the first time, the European Council adopted an 18-month work program for the following three European Presidencies to be held from January 2007 to June 2008 by Germany, Portugal, and Slovenia. Along with economic and security matters, it covers environment and sustainable

development issues, a reassurance that the EU Strategy for Sustainable Development remains in the focus of policymaking. The Environment chapter includes climate change, biodiversity, environmental technologies, and international environmental governance. The 18-month Programme confirms the EU's strong commitment to environmental matters. [January 2007. [Military Implications, Source](#)]

### **The Institute for Environmental Security in The Hague to Hold Annual Peace and Sustainability Sessions**

The Institute for Environmental Security will convene annual Peace and Sustainability sessions to address the challenges related to conflict prevention and post-conflict issues. The first session, entitled Forces for Sustainability, will be held on 14-15 March 2007 at the Peace Palace in The Hague. It intends to promote cooperation between different actors (such as the security and development sectors) involved in conflict prevention and/or transition to sustainable development in post-conflict situations. “Challenges to be addressed include—how to: formulate scenarios for change towards transparent governance structures; give priority to supervision of the phasing out of illegal economic activities; retrain and employ militias in professions for the restoration and management of ecosystems and natural resources; create new models of empowerment for local communities” says the announcement. [February 2007. [Military Implications, Source](#)]

### **French President Jacques Chirac issues Paris Call for Action for Global Ecological Governance**

An international conference on global ecological governance, “Citizens of the Earth,” was held in Paris at the instigation of President Jacques Chirac, who issued the Paris Call for Action for Global Ecological Governance and invited all nations to come to Paris to make progress on the call to action. The resulting conference, held in February, addressed new approaches to climate change, biodiversity, pollution, environmental health, water, environmental governance, and changing patterns of production and consumption. Within the nine points of the Paris Call for Action that inspired the meeting was the proposal for a Universal Declaration of Environmental Rights and Duties (the right to a sound environment) and the transformation of UNEP into a WHO-like organization to be called the United Nations Environment Organization. Green Cross International renewed its call for the adoption of an international legal instrument that would assure the right to water. Environmental degradation “could even come to jeopardize international peace and security” said UN Secretary-General Ban Ki-moon's message to the conference, and the UN General Assembly President Sheikha Haya Rashed Al Khalifa, addressing the Conference, called for “clear objectives and strong ecological governance at the global level, a concept that continues to elude us.” [February 2007. [Military Implications, Sources](#)]

### **Climate Change a Serious Threat to Security, Conclude Eminent Military Officers**

*National Security and the Threat of Climate Change*, a report by the CNA Corporation, presents the conclusions of an eminent Military Advisory Board (consisting of retired senior military officers and national security experts) on the security implications of climate change. The report looks at the geo-strategic implications of climate change in general and its effects on international security. It explores specific regional security challenges in Africa, Asia, the

Middle East, Europe, and the Americas; discusses the direct impact of some climate change aspects on military systems and operations; and presents a set of findings and recommendations related to mitigation, adaptation, and preparation, as well as policies in response to climate change. It warns that climate change could seriously exacerbate already marginal living standards... causing widespread political instability and the likelihood of failed states.... The chaos that results can be an incubator of civil strife, genocide, and the growth of terrorism... The U.S. may be drawn more frequently into these situations, either alone or with allies, to help provide stability before conditions worsen and are exploited by extremists. The U.S. may also be called upon to undertake stability and reconstruction efforts once a conflict has begun, to avert further disaster and reconstitute a stable environment.” Therefore, “The consequences of climate change can affect the organization, training, equipping, and planning of the military services.” [April 2007. [Military Implications, Sources](#)]

### **Report on Environment, Security, and Sustainable Development**

The *Inventory of Environment and Security Policies and Practices* report by the Institute for Environmental Security (IES) in the Netherlands "provides an easy to use comparative overview of existing governmental and inter-governmental positions and actions dealing with the relationship between environment, security and sustainable development." The report describes the environmental security activities of 13 (largely OECD) countries and 7 international NGOs. It also furnishes background information on IES's program, Greening European Security, which focuses on mainstreaming environmental and sustainable development factors into European foreign and security policy. [March 2007. [Military Implications, Source](#)]

### **New Environmental Security Blog**

The Environmental Change and Security Program of the Woodrow Wilson International Center for Scholars has launched a blog on new security threats. The blog provides frequent updates and commentary on the latest news stories and reports pertaining to environmental security, such as global water scarcity, climate change and terrorism. [February 2007. [Military Implication, Sources](#)]

## **CONFLICT AND POST-CONFLICT ENVIRONMENTAL SECURITY ISSUES**

### **Protocol V on Explosive Remnants of War (ERW) of the Convention on Certain Conventional Weapons came into force on 12 November 2006**

Protocol V on Explosive Remnants of War (ERW) of the Convention on Certain Conventional Weapons came into force on 12 November 2006, almost three years after it was adopted. The Protocol stipulates that Parties should take “remedial measures to mark and clear, remove or destroy unexploded ordnance or abandoned explosive ordnance” as early as possible after hostilities have ended, whether they control the territory or not, by cooperating directly or indirectly with all parties involved through quick and accurate information exchange. The Protocol is not retroactive, covering only wars occurring after its entry into force. As of the end of November, there were 27 States Parties to the Protocol.

The Portfolio of Mine Action Projects 2007 found that 26 out of 29 war-ravaged countries or territories surveyed are beleaguered with the lurking remnants of cluster bombs and other



explosives. In 2007, the focus of the Projects will be on unexploded ordnance, aiming to deal with the aftermath of conflicts that took place before Protocol V entered into force. [November 2006, [Military Implications, Sources](#)]

### **Progress Made on Banning Cluster Bombs**

At the Conference on Cluster Munitions held in February 2007 in Oslo, 46 states and several international organizations decided to develop, by 2008, a legally binding international instrument to ban the use, production, transfer, and stockpiling of cluster munitions, as well as to create a framework for dealing with the consequence of cluster munitions' use in the affected areas. Environmental damage and civil casualties are the highest concern for banning cluster bombs. Next meetings are planned for May/June in Lima, November/December in Vienna and early 2008 in Dublin. Last year Belgium has become the first country to ban cluster bombs, and this month [March 2007] the Belgian Senate passed legislation that criminalizes investment in companies that make cluster munitions. The Belgian Parliament plans to publish a list of companies that manufacture such munitions. Austria announced a moratorium on the use, production, or trade of cluster munitions. Canada promised to destroy its stockpile of cluster munitions. The U.S. Democrats recently introduced a bill in the U.S. Senate proposing to "restrict federal funds for the use, sale or transfer of cluster bombs." Presently there are 34 countries producing cluster munitions and about 75 countries that stockpile them. [See also related items *CCW Protocol V on Explosive Remnants of War Entered into Force in November 2006*, *NGOs Launch Campaign to Ban Cluster Bombs*, and *Draft Protocol on Cluster Bombs Cleanup Liability*] [March 2007. [Military Implications, Sources](#)]

### **International Crisis Group to Debate Considering Climate Change Variable in Conflicts**

The International Crisis Group, which tries to prevent conflicts by monitoring vulnerable regions based on indicators such as political instability, began in June to debate whether to include climate change as a new variable in its analysis. [June 2007. [Military Implications, Sources](#)]

### **Hezbollah-Israeli War Threatens an Already Precarious Environment**

Arab countries are among the least environmentally sustainable in the world. The current wars are making this situation worse. The impact of the oil slick caused by Israeli bombing of the Jiyeh power station is an "environmental tragedy which is rapidly taking on a national but also a regional dimension," warned UNEP Executive Director Achim Steiner. Long-term implications also include the loss to fishing for the Lebanese people, and decline in tourism. Presently the ecological damage spreads along 50 miles of the Lebanese coast; 10,000 tons of crude oil have been released into the Mediterranean, with another 15,000 tons expected to spill very soon. According to the Environmental Sustainability Index of Yale University, Iraq, Sudan, and Kuwait fall within the bottom 5% of the world for sustainability and half of the remaining Arab States scored in the lowest 25%. Without major changes, environmentally induced migrations and more conflicts in the region seem inevitable. [July 2006, [Military Implications, Sources](#)]

### **Addressing Post-Conflict Environmental Security Issues**

Further on last month's item on the environmental consequences of the Hezbollah-Israeli war, UNEP announced the beginning of the cleanup operation of the massive oil spill caused by Israeli bombing of a fuel depot, which affected some 150 kilometers of Lebanese and Syrian

coastline. It is estimated that the cleanup could take up to one year and might cost over \$64 million. The massive damages to the ecosystem are already noticeable. [See also *Hezbollah-Israeli War Threatens an Already Precarious Environment* in July 2006 environmental security report.]

At the end of July 2006, the UN Compensation Commission announced the last disbursement to individuals who suffered because of Iraq's 1990 invasion of Kuwait. The total paid out to date is nearly \$21 billion, while 49 other claims, including environmental ones are still pending. [August 2006. [Military Implications, Sources](#)]

#### Environmental Legacy of Hezbollah-Israeli War

Lebanon—Post-Conflict Environmental Assessment, UNEP's Post Conflict Branch report, is a comprehensive assessment of the legacy of last summer's Hezbollah-Israeli war in Lebanon and its impact on the environment and human health. The report details serious environmental challenges confronting the Lebanese authorities and threatening the population's health, and calls for urgent remediation actions. The highest risks are posed by leaked toxic and health hazardous substances, disposal of significant quantities of war-related debris, unexploded cluster bombs, and damaged water supply and sewage networks. [January 2007. [Military Implications, Sources](#)]

#### **Environment to Get Crucial Role in Sudan's Future Peace and Prosperity Strategy**

UNEP is conducting detailed environmental assessments in order to identify environmental impacts, pressures, risks, and priorities for Sudan's post-conflict reconstruction plans. Since December 2005, four field missions were conducted in each of the main geographic areas. These findings will be presented in the UNEP report Sudan – Post-Conflict Environmental Assessment scheduled for release in October 2006 and then incorporated into national policies, plans, and laws for resource management in Sudan. UNEP is also currently preparing a program entitled Capacity Building for Environmental Governance in Sudan, which will cover the period 2007-2009. The UNEP study and recommendations are another example of the importance being accorded to the environmental dimension in post-conflict reconstruction. [July 2006. [Military Implications, Source](#)]

#### UNEP Warns No Peace in Sudan without Environmental Management Plan

The UNEP report Sudan Post-Conflict Environmental Assessment underscores that the conflict-torn region is unlikely to achieve a lasting peace unless it switches to sound natural resources management. Desertification and deforestation, spread of deserts southwards, increased pressure by unsustainable agriculture, and environmental degradation exacerbated by oil exploitation all contribute to increasing scarcity of resources, the main cause of the Sudan conflict. The report emphasizes that if these problems are not quickly and appropriately addressed the conflict might spread. [June 2007. [Military Implications, Sources](#)]

#### **Report on Lebanon After-war Environmental Assessment**

Lebanon Rapid Environmental Assessment for Greening Recovery, Reconstruction & Reform—2006 report is a comprehensive review of the major environmental impacts caused by the July-August 2006 war, proposes some action plans to mitigate them, and explores opportunities for green reconstruction and recovery. It also looks at such environment-related legal aspects as

improving national legislation and the options available to the Government of Lebanon to seek compensation for environmental damage. [February 2007. [Military Implications, Sources](#)]

### **Environmental Change and Security 12th Annual Report—Focus on Africa**

The 12th annual report of the Woodrow Wilson Center's Environmental Change and Security Program explores the link between environment, conflict, and cooperation in Africa, focusing on fragile states. It calls attention to other smaller—local—conflicts triggered by increasingly shrinking resources due to population growth, climate change, and accelerated environmental degradation. It warns that unless timely measures are taken, those small conflicts might escalate into wars and humanitarian disasters, such as in Sudan's Darfur region. However, "efforts to promote sustainability—and use natural resources as peacebuilding tools—could help turn deadly environments into safe, sustainable neighborhoods" say the authors. The report includes the contributions of eight African leaders and scholars. [June 2007. [Military Implications, Source](#)]

### **Environment and Security Initiative Progress Report 2006**

*The Environment and Security Initiative—An international partnership for managing conflict and risk*, progress report 2006, highlights advancement of ENVSEC sub-regional projects' implementation in the Southern Caucasus, Central Asia and South Eastern and Eastern Europe, as well as the initiation of an environment and security risk assessment in the Belarus, Moldova and Ukraine sub-region. The issues identified for urgent attention by ENVSEC include: wastes, stocks of rocket fuel and obsolete pesticides from Soviet times, shared waters, and the continuing environmental consequences of the Chernobyl disaster. "Activities conducted under the ENVSEC Initiative show that environment can act as a bridge for crossboundary cooperation" says the report. The 2007–2009 work program includes over 70 projects based on region-specific priorities "related to need of further assessments, policy development, institution and capacity building as well as technical cooperation." [April 2007. [Military Implications, Source](#)]

### **Japanese Chemical Weapons Cleaning in China Yet to be Completed**

June 2007 was the deadline agreed to by Chinese and Japanese authorities for cleaning up the Japanese chemical weapons littering China since the Japanese war against China. Yet, this month, a number of Chinese construction workers suffered health problems after being exposed to a ruptured mustard agent bomb believed to have been dropped by a Japanese warplane many years ago. The unexploded bomb was hit by the construction team while excavating for a residential building in Bayannaoer City in Inner Mongolia. The Japanese government is expected to receive a request to destroy the weapon, sources said. In May 2007, Japan's Supreme Court ruled that Chinese victims of Japanese biological warfare and other atrocities that occurred before and during World War II are not eligible for compensation. [June 2007. [Military Implications, Sources](#)]

### **Japanese Supreme Court Denies Chinese Wartime Claims**

Japan's Supreme Court ruled that Chinese victims of Japanese biological warfare and other atrocities occurred before and during World War II are not eligible for compensation. Two cases involving about 200 Chinese required compensation and Japanese government apologies for



biological weapons experiments, the firebombing of a Chinese city and other atrocities happened in the 1930s and 1940s. The majority of the plaintiffs were relatives of the victims. "These are unjust rulings that ignore the human rights and personal suffering of the defendants. [...] The Supreme Court has completely neglected its responsibility to uphold justice." Historians estimate that up to 250,000 people might have died in Japan's Unit 731 experiments that involved germ testing and vivisection. No unit personnel ever faced prosecution and Japan argues that the cases brought up happened before Japan's ratification of relevant treaties. [See also *Discussions over World War II Japanese Warfare Program in China not Settled Yet, China: Japan to Pay \$2.7 Million for War Gas Leak*, and *Effects of Poison Gas Used in WWII by Japan*.] [May 2007. [Military Implications, Sources](#)]

## **NATIONAL/REGIONAL ENVIRONMENTAL STRATEGIES AFFECTING MILITARY ACTIVITIES**

### **Pan-African Parliament Upgrades Environmental Policy**

Environmental issues were given increased emphasis during the Pan-African Parliament (PAP) Seventh Ordinary Session held in May 2007. Deputies and experts discussed the liability of Western countries relating to the continent's environmental degradation, and called for financial compensation and technological assistance to correct the situation. The recommendations of the committee on the environment included: request the PAP strengthen legislation for protection of the environment and fighting against pollution; establish synergy among African scientific research institutions related to protecting the environment; create a network of environmental centers; create an African Environment Protection Observatory (AEPO); support regional initiatives; improve global cooperation and implementation of the Convention on Desertification; and strengthen international cooperation in scientific research and technology transfer. There were important debates about an African integration—a United States of Africa model—and the final document recommends that the African Union further consider such a union's feasibility. It also recommends giving PAP, which started in 2004, the powers of a legislative organ. [May 2007. [Military Implications, Sources](#)]

### **Argentina Redeploys Military to Defend Water and Oil**

The Argentine government is changing its military strategy based on the forecast that conflicts over water and oil are the most likely long-term national security threats. The most vulnerable area is the Guarani aquifer that neighbors Uruguay, Brazil, and Paraguay. The Army "Plan 2025" was launched last year and includes parceling the country into regions based on their resource potential—mainly oil and fresh water. "Each division will be based in the geographical areas where the natural resources that we hypothetically must defend are located," Argentine Army Commander-in-Chief Roberto Bendini said in revealing the plan. [March 2007. [Military Implications, Sources](#)]

### **European Temporary Committee on Climate Change to Begin Operations in May**

The European Parliament approved the establishment of a new temporary committee on climate change. The 60-member committee will start work on May 10, 2007. It will design and suggest strategies and policy options for the 27 EU states to address energy and climate change issues. It is also expected that the committee will strengthen EU's international role in intensifying action

to tackle climate change, pushing it to the top of the international agenda and furthering post-Kyoto Protocol's negotiations. [See also *EU Energy and Climate Change Policy*.] [April 2007. [Military Implications, Sources](#)]

### **U.S. Created Committee to Address Climate Change and Energy Security Issues**

The U.S. Congress created a 15-member Select Committee on Energy Independence and Global Warming to provide information and advice on the best policies to address America's energy security and climate-change issues. "Energy independence and climate change are issues of national security and national urgency," said House Speaker Nancy Pelosi (D-Calif.) announcing the creation of the committee. [Note: A nationwide poll conducted for the Yale Center for Environmental Law and Policy revealed that 63% of Americans agree that the U.S. "is in as much danger from environmental hazards, such as air pollution and global warming, as it is from terrorists" and 81% of Americans are ready to take action personally in response to climate change.] [March 2007. [Military Implications, Sources](#)]

### **Sustainable Development Strategies**

The Intergovernmental Preparatory Meeting for the 15th session of the Commission on Sustainable Development (CSD-15) took place February 26-March 2, 2007 and discussed policy options and possible actions related to four thematic areas: energy, industrial development, air pollution/atmosphere, and climate change in the context of sustainable development, as well as the situation of small island developing states (SIDS), and inter-linkages and cross-cutting issues in the framework of the thematic areas. The draft Chair's "negotiating document" that will be transmitted directly to CSD-15 has six sections, covering the four thematic areas, inter-linkages and crosscutting issues, and review and follow up. The 15th session of the CSD will be held April 30-May 11, 2007, in New York. Climate change also topped the agenda of the G-8 meeting held in Potsdam, Germany, March 16-17. The meeting, attended by environmental ministers of the G-8 countries plus China, India, Brazil, Mexico and South Africa, aimed to prepare for the G8 summit to be held in June, in Heiligendamm and the discussions for the December Climate Change Conference. Although consensus was reached on the need to protect the world's environment, consensus was not yet achieved on either post-Kyoto strategies nor on a global carbon emissions trading scheme like the one used in the EU. [March 2007. [Military Implications, Sources](#)]

### **EU and US to Cooperate on Environmental Research**

The US Environmental Protection Agency and the EU Commission's Directorate of Research have signed an agreement, *Implementing Arrangement on Environmental Research and Ecoinformatics*, setting up a bilateral research framework to more strategically address common environmental challenges. Among the collaborative research topics are: uses and impacts of nanotechnology; environmental information systems; development of environmental and sustainability indicators; environmental modeling; decision support tools; environment and health; sustainable chemistry and materials; environmental technologies; and air quality management. [February 2007. [Military Implications, Sources](#)]

### **Asia-Pacific Should Intensify Green Growth Efforts**

The State of the Environment in Asia and the Pacific 2005 report, published by the United Nations Economic and Social Commission for Asia and the Pacific, notes that the region needs to shift towards ecologically efficient, 'green growth' patterns, if it wants to continue its growth. Acknowledging some efforts on new regulations, it documents that many areas are still in great need of improvement. High population density, low freshwater availability and biologically productive area per capita of all global regions, and the growth of highly energy-intensive and polluting industries, along with increasing waste, are some of the most important concerns. The report offers a comprehensive picture of the region's trends both as problems, and as shortfalls that still have to be regulated. [December 2006. [Military Implications, Sources](#)]

### **China Calls for Enhanced Cooperation on Environmental Protection in Northeast Asia**

At the Opening of the 12th Senior Officials Meeting of the North-East Asia Sub-regional Program for Environmental Cooperation, Cui Tiankai, Assistant Foreign Minister of China, said environmental protection is an integral part of international and regional cooperation as nations face a number of traditional and non-traditional security threats. He urged six member countries (China, Japan, North Korea, Mongolia, Russia and South Korea) to enhance cooperation on environment and sustainable development. [See also *Asia-Pacific Should Intensify Green Growth Efforts*, *New Environmental Think Tank for Asia*, and *Meeting of Asia-Pacific Partnership on Clean Development and Climate*.] [March 2007. [Military Implications, Sources](#)]

### **The Disputes over the Northern Territories Set to Continue**

As the North is warming up, opening access to its rich resources, the territorial claims over the Arctic region are set to increase. Reportedly, Russia is prepared to challenge the international community and claim sovereignty over large parts of the Arctic region that is now under the International Seabed Authority, on grounds of the region's geological continuity and similarity with continental Russia. [June 2007. [Military Implications, Source](#)]

### **New Canadian Strategies for Monitoring the Northwest Passage**

Further on the opening of the Northwest Passage, the Canadian government is undertaking serious military and strategic operations for increased monitoring of the area for actions that might affect its sovereignty over the territory, as well as ecological impacts. In spite of strong disagreement between the Canadian Department of National Defence and Environment Canada on projections concerning the timing of the Passage's accessibility for commercial and other navigation, new capabilities, funding and apparatus are being considered for increasing control. Those include: enforcing the Arctic Waters Pollution Prevention Act for avoiding ecological disasters; a highly mobile Rapid Reaction Battalions (based in B.C., northern Quebec, Newfoundland, and Ontario); armed icebreakers; and a deep-water port at the passage's eastern entrance. [See also *Northwest Passage to Become "Canadian Internal Waters"* in April 2006, and *Arctic Northern Passage Opens New International Issues of Regulation* in February 2006 environmental security reports.] [August 2006. [Military Implications, Source](#)]

### **China's Climate Change and S&T Action Plan**

China launched its first national climate change program in June 2007. Although it does not include mandatory caps on emissions, it shows a strong commitment to reducing greenhouse gas emissions. The program highlights some major targets and actions to achieve them by 2010: reducing energy consumption by about 20% per GDP unit; increasing the share of renewable energy to 10% of the primary energy supply; keeping emissions of nitrous oxide from industrial processes at 2005 levels; increasing reforestation by 20%, and increasing international cooperation. The program notes that "China's energy efficiency is about 10% lower than that of the developed countries, and its per unit energy consumption of energy-intensive products is about 40% higher than the advanced international level. Science and technology are the ultimate resort for humankind to tackle climate change." In view of this, the Chinese Ministry of Science and Technology has released an action plan for the science and technology (S&T) aspects of China's new climate change initiative.

Note: The Chinese State Environmental Protection Administration report released in June reveals a continuous deterioration of air and water quality in Chinese cities despite national efforts to reduce pollution levels. Concomitantly, preliminary estimates by the Netherlands Environmental Assessment Agency reveal that in 2006 China surpassed the U.S., becoming the world's largest CO2 emitter. [June 2007. [Military Implications, Sources](#)]

### **China to Invest \$175 Billion in Environmental Protection over Five Years**

China plans to invest \$175 billion (about 1.5% of GDP) in environmental protection in the next five years, to curb severe water and air pollution, which is causing riots and health problems. The money is to be spent on such measures as control of water pollution, improving air quality in cities, and halting soil erosion. China has 20 of the world's 30 most smog-affected cities, and 2.5% of its grain is estimated to be contaminated by heavy metals. [See also *China Creates 11 Independent Environmental "Watchdog" Centers* in the July 2006, *China's President Hu Ordered Environmental Regulations for Military Activities* in April 2006, *Chinese Research Priorities for the Next Fifteen Years* in March 2006, and other related items in previous environmental security reports.] [September 2006. [Military Implications, Sources](#)]

### **China Creates 11 Independent Environmental "Watchdog" Centers**

China is establishing eleven watchdog centers to monitor and investigate environmental issues free from local government interference. The centers will operate under direct control of the State Environmental Protection Administration (SEPA) and will include five centers for environmental supervision, and six centers to monitor nuclear and radiation security. The main role of this nationwide network is to enforce environmental laws and regulations independent of local governments. The 11 centers will be included in SEPA's 24-hour emergency response system. [See also *China's President Hu Ordered Environmental Regulations for Military Activities* in April 2006, and *Chinese Research Priorities for the Next Fifteen Years* in March 2006, and other related environmental security reports] [July 2006. [Military implications, Source](#)]

## **Ecuador Gets an Environmentalist Foreign Minister**

President Rafael Correa of Ecuador (to take office in January) has named a US-trained environmentalist, Maria Espinosa, as his foreign minister. The new cabinet member is head of the World Conservation Union in South America and an expert on nature reserves. The nomination comes at a time of growing tensions with neighboring Colombia over spraying of drug crops near the border, which damages Ecuadorian legal crops and the health of people living in the area. [December 2006, [Military Implications, Source](#)]

## **TECHNOLOGICAL BREAKTHROUGHS WITH ENVIRONMENTAL SECURITY IMPLICATIONS**

### **Computer Technology and Robotics**

#### **UNEP and Google Earth to Pinpoint Environmental Hotspots**

The United Nations Environment Programme has joined together with Google Earth to highlight environmentally plagued regions of the world and to compare them to previous maps of the same regions. This technology grants millions of people around the world access to accurate, easily comprehensible, and timely visuals of rapidly changing environments. This information could help increase public awareness, as well as alerting authorities to prevent eventual security issues due to environmental changes. Additionally, dissemination of this type of information will be beneficial for capacity building, teaching, and stimulating action against environmental degradation. Presently, the “UNEP: Atlas of our Changing Environment,” offers satellite images of 100 environmental hotspots from around the world. Google Earth images are not real-time images but have all been taken in the last three years. The continual improvement and widespread use of the “Atlas of our Changing Environment” could provide unique opportunities to help prevent environmentally related conflicts. [September 2006. [Military implications, Sources](#)]

### **New Detection and Cleanup Techniques**

[FAO/IAEA Meeting Discusses Portable Disease Detection Devices](#)

[Portable Mass Spectrometer and Gas Chromatograph](#)

[Nanotech-based Explosives Detector](#)

[Detector Materials for Cyanogen Halides from Chemical Weapons](#)

[New Spectroscopy Technique Speeds Up Virus Detection](#)

[Nanofibrils Film Improves Explosives Sensing Performance](#)

[Bacterial Proteins Help Nanoparticle Cleanup](#)

[New Material Has High Absorbency for Organic Solvents](#)

[New Production Technique for Nanofiber Filters for Chemical Warfare Protection](#)

[Sugar-coated Nanotubes Stop Anthrax Inhalation](#)

[New Spectroscopy Sensor for Environmental Monitoring](#)

Nanocantilevers for Ultra-small Sensors  
Digital Magnetofluidics Improves Biochemical Analysis  
Biosensors Sniff out TNT and Possibly Other Dangers  
Reliable Anthrax Antibodies Developed  
Bar-coded Nanowires May Yield Small, Fast Bio Detectors  
New Low-cost System for Bacteria Identification  
Quantum Dot Device Provides Fast Detector for DNA Sequences  
Sensicore's Lab on a Chip Water Profiler Automates Lab Functions  
Deep Cooling Improves Uranium Detection  
Biodetecting Wipes  
Fish Provide Early Warning of Toxic Chemicals  
Ultrasound Soil Cleanup Technique  
New Surface Decontamination Method  
Virus Detection Technique—Fast, Convenient, and Sensitive  
New Technique for DNA Isolation  
Sensitive Uranium Detector Using DNA  
New and Improved Water Purification Method

### **FAO/IAEA Meeting Discusses Portable Disease Detection Devices**

A five-day meeting in Verona, Italy discussed new mobile rapid disease detection technology that experts say could revolutionize the fight against bird flu and many other livestock disorders. One of the topics at the conference, sponsored by the Joint FAO/IAEA Programme, a Vienna-based partnership between FAO and the International Atomic Energy Agency, was a \$1,000 mobile test system and reader the size of a small portable television. Further work is in progress to reduce it to what researchers call a "laboratory in a pen". [March 2007. [Military Implications, Source](#)]

### **Portable Mass Spectrometer and Gas Chromatograph**

Researchers at Brigham Young University in Utah have developed a portable mass spectrometer and gas chromatograph for detecting biological and chemical agents. This easy to use and portable instrument can analyze a sample and—based on an internal library of known chemicals and biological agents—identify the material and the level of danger. The researchers intend to create a palm-sized version of the device. [March 2007. [Military Implications, Source](#)]

### **Nanotech-based Explosives Detector**

Prof. Li Guang-tao of the Key Laboratory of Organic Optoelectronics & Molecular Engineering of the Ministry of Education at Tsinghua University, Beijing, and his group have developed



nanocomposite silica films doped with porphyrins (nitrogen-containing macrocyclic molecules) which produce a very fast fluorescence response to trace vapors of explosives such as TNT, DNT and NB (nitrobenzene). These films can be used as the basis for small, cheap, and fast environmental detectors. [December 2006, [Military Implications; Source](#)]

### **Detector Materials for Cyanogen Halides from Chemical Weapons**

Researchers at the Dept. of Chemistry at MIT, led by Samuel W. Thomas III, have developed new phosphorescent detecting compounds for cyanogen halides, used in chemical weapons. The new materials have greatly improved sensitivity to trace amounts of the toxins in the environment. [December 2006, [Military Implications, Source](#)]

### **New Spectroscopy Technique Speeds Up Virus Detection**

A nanotech-based diagnostic test that can detect viruses as diverse as influenza, HIV, and respiratory syncytial virus in a minute or less was developed by a veterinary research team at the University of Georgia. The technique referred to as surface enhanced Raman spectroscopy (SERS) measures the Raman frequency shift of a near-infrared laser as it scatters off viral DNA or RNA. The test has the advantage of detecting the viral DNA or RNA itself rather than the indirectly produced antibodies that are the basis of other viral testing. This provides a much more rapid and reliable evaluation of the threat. The basic method was well known but the signals produced were unusably weak. The breakthrough here was placing silver nanorods at an 86° angle on the specimen slides, an addition that enormously increased the strength of the returns. [November 2006. [Military Implications, Source](#)]

### **Nanofibrils Film Improves Explosives Sensing Performance**

A team of scientists from the University of Illinois and the Chinese Academy of Sciences developed a new fluorescent film, made from nanofibrils, which offers greatly improved performance in the detection of such explosive vapors as TNT. These sensors indicate the presence of explosives by losing their glow. They can be recycled repeatedly and also resist deterioration from exposure to sunlight. [June 2007. [Military Implications, Source](#)]

### **Bacterial Proteins Help Nanoparticle Cleanup**

A new discovery indicated that bacteria could excrete proteins causing metal nanoparticles to aggregate, making them easier to remove from the environment. Apparently the bacteria produce the proteins to protect themselves from potentially toxic nanoparticles. The team of researchers from the Lawrence Livermore National Laboratory, UC Berkeley, and the Lawrence Berkeley National Laboratory found the bacteria at the abandoned Piquette Mine, in southwestern Wisconsin. Peter Weber from the LLNL notes that the discovery indicates that cysteine or cysteine-rich polypeptides or proteins could potentially be used for nanoparticle clean up. “With the boom in nanoscience, people are naturally asking questions about the potential environmental impacts. Here, we see that naturally produced nanoparticles can be naturally controlled,” he commented. [June 2007. [Military Implications, Source](#)]

### **New Material Has High Absorbency for Organic Solvents**

Researchers at Kyushu University in Fukuoka have developed a new material, which can absorb large amounts of organic solvents such as chloroform. The material can absorb 300-480 times its weight of various agents. [June 2007. [Military Implications, Source](#)]

### **New Production Technique for Nanofiber Filters for Chemical Warfare Protection**

A new 3D honeycomb structure of polymer nanofibers, which, when incorporated into protective gear, would be much more efficient in adsorbing and possibly destroying dangerous chemical warfare agents in the environment was developed by scientists led by Dr. Seshadri Ramkumar, Asst. Prof. at the Institute of Environmental and Human Health at Texas Technology University. [October 2006. [Military Implications, Source](#)]

### **Sugar-coated Nanotubes Stop Anthrax Inhalation**

Clemson University chemist Ya-Ping Sun and his team have developed a technique that uses sugarcoated carbon nanotubes to render weaponized anthrax harmless. Finely divided anthrax spores in the environment bind to the sugar coating, forming clusters too large to be inhaled, rendering the weapon useless. [See also *Sugar-Coated Gold Nanoparticles Detect Toxins* in April 2006 environmental security report] [October 2006. [Military Implications, Source](#)]

### **New Spectroscopy Sensor for Environmental Monitoring**

University of Wyoming researchers have developed and patented a sensor that can be used with surface plasmon resonance (SPR) spectroscopy to produce a low-cost system for rapid detection of biological signatures, explosives, and other volatile chemical targets in the environment. The sensor element comprises a specially designed surface optically coupled to an SPR spectrometer. Molecules such as antibodies are held close to the SPR surface, with no intervening liquid/hydrogel layer, maximizing sensitivity. [September 2006. [Military Implications, Source](#)]

### **Nanocantilevers for Ultra-small Sensors**

Researchers at Purdue University are investigating the use of nanocantilevers in designing a new class of ultra-small sensors for quick detection of viruses, bacteria and other contaminants in air and fluids by coating the cantilevers with proteins, including antibodies that attract the contaminants. Nanocantilevers vibrate at different frequencies when contaminants stick to them, revealing the presence of dangerous substances. The work is funded by the National Institutes of Health. [September 2006. [Military Implications, Source](#)]

### **Digital Magnetofluidics Improves Biochemical Analysis**

A technique for more rapid, more accurate, and less costly analysis of biochemical fluids, such as is needed in biological warfare surveillance, was developed by the Department of Bioengineering of the University of Arizona in cooperation with other scientists. Based on magnetic forces, this form of "lab on a chip" minimizes contamination of the sample by the substrate, and saves both time and expensive chemicals. [August 2006. [Military Implications, Sources](#)]



### **Biosensors Sniff out TNT and Possibly Other Dangers**

Temple University School of Medicine Fels Institute researcher Prof. Danny Dhanasekaran and colleagues have developed a new biosensor that uses a yeast strain genetically engineered with mammalian (rat) olfactory signaling machinery, linked to the expression of green fluorescent protein, to detect a chemical signature of TNT. The technique should be extendable to spot other chemical agents, such as sarin.

Biosensor 2200R, developed by Mine Safety Appliances Inc. of Pittsburgh, is a new biosensor able to determine the presence of a suspicious biological agent such as anthrax or ricin. The response time is less than 5 minutes (compared to about 45 minutes for the devices presently in use) and the unit has a very high accuracy, with only a one in a million chance of producing a false reading. [May 2007. [Military Implications, Source](#)]

### **Reliable Anthrax Antibodies Developed**

Swiss scientists have developed reliable anthrax-specific antibodies. This is an important achievement, since the similarity of the anthrax spore surface to that of spores of other bacteria, which commonly occur in humans, has previously prevented development of an antibody that would be reliably anthrax-specific for identification. [August 2006. [Military Implications, Sources](#)]

### **Bar-coded Nanowires May Yield Small, Fast Bio Detectors**

A "nanowire bar-code" system developed by researchers at Lawrence Livermore National Laboratory in cooperation with several other institutions may facilitate creating portable sensors capable of identifying multiple airborne pathogens within minutes. The technique consists of coating a nanowire with a distinctive pattern of gold and silver stripes—analogue to a barcode—and then with an antibody for the target threat. The applications of such a system range from detection of biowarfare agents to use during an outbreak of an infectious disease. [August 2006. [Military Implications, Sources](#)]

### **New Low-cost System for Bacteria Identification**

Researchers at Purdue University's Bindley Science Center have developed a new low-cost high-speed system that analyzes scattered laser light to quickly identify bacteria. The technique uses computer analysis of 120 factors in laser light scattered by bacterial colonies growing in a petri dish, costs a tenth as much as conventional methods, and can be completed in five minutes after the culture has grown. [August 2006. [Military Implications, Sources](#)]

### **Quantum Dot Device Provides Fast Detector for DNA Sequences**

Researchers at Quantum Logic Devices, of Austin TX, have constructed a DNA sequence detector that can detect a piece of DNA in less than 30 minutes, compared to 24 hours for a fluorescence technique. [August 2006. [Military Implications, Sources](#)]

### **Sensicore's Lab on a Chip Water Profiler Automates Lab Functions**

This system applies chip technologies in a WaterPOINT device that dramatically shrinks the space and time required to perform sixteen standard water quality and treatment tests. Memory

and software permit rapid comparisons and mapping of results for entire systems. The 0.4-millimeter pH electrode illustrates the degree of miniaturization achieved. Several wet chemistry procedures are reduced from hours to minutes in duration without the need for reagents. Additional testing capabilities are in development for promised availability in the near future. [August 2006. [Military Implications, Sources](#)]

### **Deep Cooling Improves Uranium Detection**

Zheming Wang, at the Department of Energy's Pacific Northwest National Laboratory in Richland, Wash., has applied cryogenic fluorescence spectroscopy to detect uranium in contaminated soil at a former nuclear fuel manufacturing site. Use of an ultraviolet laser on the sample cooled to  $-267^{\circ}\text{C}$  produced fluorescence intensity of more than five times that at room temperature, and brought out additional spectral features enabling different forms of uranium, including uranium carbonate, to be distinguished. [September 2006. [Military Implications, Source](#)]

### **Biodetecting Wipes**

Scientists at Cornell University have started development of an inexpensive and easy-to-use biodegradable absorbent wipe containing polymer nanofibers attached to antibodies for biohazards and chemicals. By changing color, or through another effect, the wipes signal when the antibodies bond to their targets. The 100 nm fibers provide very large surface areas for sensing, and increased absorbency compared to conventional fibers. [September 2006. [Military Implications, Source](#)]

### **Fish Provide Early Warning of Toxic Chemicals**

Bluegills, a small, hardy fish species, are highly sensitive to chemical disturbances in their environment, and react to toxins by convulsively flexing their gills to expel contaminating material. They can be used to monitor the chemical purity of a water supply by keeping them in a continuously re-supplied tank equipped with sensors to watch for changes in their breathing, heartbeat, and swimming patterns. The fish have successfully detected 30 alien chemicals, and have the advantage of requiring no "programming" for specific hazards. Their sensitivity was demonstrated on one occasion when they detected a diesel spill two hours before other sensors. The fish have been incorporated into an operational system by Intelligent Automation Corp. of Poway, CA. [September 2006. [Military Implications, Source](#)]

### **Ultrasound Soil Cleanup Technique**

Researchers at CSIRO Industrial Physics near Sydney, Australia have shown that high-intensity ultrasound can destroy toxic or carcinogenic persistent organic pollutants (POPs) that commonly contaminate land. According to New Scientist, "Cleaning them up is difficult. Incineration can produce toxic breakdown products, while chemical treatment methods can require huge amounts of energy or involve substances almost as toxic as those being cleaned up – risking dangerous leakages." The new technique, which avoids those problems, mixes the soil with water and then passes it through a chamber where the ultrasound produces localized temperatures of  $4000^{\circ}\text{C}$  and pressures of 1000 atmospheres, destroying up to 97% of the contaminants in a few minutes. [October 2006. [Military Implications, Source](#)]

### **New Surface Decontamination Method**

Bradley D. Veatch of Westminster, CO and associates have filed a patent application for a novel means of removing contamination, including radioactive material, from surfaces. An abrasive foam pad soaked in a mix of latex gel and conductive iodine solution is rubbed over the contaminated area, loosening any surface material and applying a layer of latex, while a high current is passed through it. An electrolytic reaction transfers the contaminant from the surface into the latex gel, and also polymerizes the gel, producing a strong rubbery skin, which can be peeled off and safely discarded. [January 2007. [Military Implications, Sources](#)]

### **Virus Detection Technique—Fast, Convenient, and Sensitive**

Aurel Ymeti and associated researchers at the Univ. of Twente, Enschede, the Netherlands, and elsewhere, have developed an improved new technique for virus detection and identification. As is the case with a number of other methods, it depends on the adhesion of the virus to an antibody-coated surface, but here the adhesion is detected optically, greatly improving the device's characteristics. A monochromatic laser beam is sent down a path which branches into two parallel channels and then rejoins. One of the channels is coated with the antibody; the beam in that channel undergoes a phase shift if the sample has attached to the antibody. When the beams from the channels are recombined, the phase shift produces a pattern of interference fringes if the virus was present. This detector is able to detect the herpes virus at just 850 particles per milliliter under physiological conditions (e.g. in human serum). [January 2007. [Military Implications, Source](#)]

### **New Technique for DNA Isolation**

TNO, in Delft, Netherlands, has developed a new tool, SamPrep, for the rapid automatic pre-treatment of biological material to separate out pure DNA for further analysis. The new automated system can produce results from a sample in 20 minutes instead of the hours required for manual manipulation. [January 2007. [Military Implications, Source](#)]

### **Sensitive Uranium Detector Using DNA**

Researchers at the University of Illinois and elsewhere, led by chemistry Professor Yi Lu, have developed a uranium sensor which they say "combines the high metal ion selectivity of catalytic DNA with the high sensitivity of fluorescence detection [and] provides a fast, on-site test for assessing uranium contamination in the environment and the effectiveness of remediation strategies". The sensor has a sensitivity of 11 parts per trillion. [February 2007. [Military Implications, Sources](#)]

### **New and Improved Water Purification Method**

Delft University of Technology (Netherlands), with Merle de Kreuk as principal researcher, and the DHV engineering consultancy, has developed a compact and environmentally friendly water purification method, in which aerobic bacteria form granules that sink quickly. In this new aerobic granular sludge technology (Nereda™), aerobic bacterial granules are formed in the water that is to be purified. These granules not only sink quickly but their use also has the advantage that only one vessel is needed for the process. The new technique requires 25% of the

space and 70% of the energy needed for earlier methods. [July 2006. [Military Implications, Source](#)]

## **Space Technology**

### Space Technology for Environmental Security

The 2007 ESA Envisat Symposium discussed how ESA (European Space Agency) satellites could improve understanding of the carbon cycle and thus advance climate change forecasting, improve decisionmaking, and also improve monitoring of international treaties aimed at reducing greenhouse gas emissions, such as the Kyoto Protocol. Special sessions were dedicated to the Global Monitoring for Environment and Security (GMES) program, and use of Earth observation satellites in support of international environmental conventions. Prior to the Symposium a high-level conference was held: “The Way to the European Earth Observation System GMES—Munich Roadmap” regarding the first GEMES services, the Commission’s proposal for GEMES long-term sustainability, and the proposal for adoption by the Council and implementation of the first generation of GMES-dedicated satellites. GMES is also a key part of the new European Space Policy adopted by the European Commission, to be presented for discussion and endorsement to the Space Council on 22 May 2007. [See also *Space Technology for Improving Planetary Knowledge and Security*, *Space Technology to Help Enforce Environmental Regulations in November and Climate Change--Improved Satellite Climate Change Monitoring* and other related items.] [April 2007. [Military Implications, Sources](#)]

### Space-Based Services for Improving Emergency Response

The Health Early Warning System will improve warning and emergency response in case of natural disasters and pandemics by using satellite communication. HEWS consists of a communication network via satellite to survey and monitor risk indicators. It is connecting end-user relieve agencies with command centers, provides wide, real-time perspective of the events and knowledge related to the threat, and helps with logistical support, thus improving the emergency effort efficiency. HEWS is an open platform, widely implementable. Another European initiative, Eurisy programme dedicated to Local and Regional Authorities, aims to help end-user communities understand how space technology-based tools can help them in some complex activities such as monitoring environment matters, handling natural disaster, and e-Government. The Conference “Future Challenges for Local and Regional Authorities: How can Space Technology help?” held May 29-30 in Barcelona, is the first event of Eurisy’s 3-year programme. The China National Space Administration joined on May 24, 2007, the International Charter “Space and Major Disasters,” an international network of international, private and government space agencies that aims to provide satellite data free of charge in emergency situations to those affected by disasters anywhere in the world. At the Pan African Parliament’s (PAP) Seventh Ordinary Session held in May 2007, delegates recommended increased international cooperation in scientific and technological research, including the use of space tools to help decisionmaking related to fight against desertification and climate change. [May 2007. [Military Implications, Source](#)]

## **Technologies that Could Trigger New Forms of Arms Race**

### **Futuristic Nanotech and Synthetic Bioweapons Regulation**

With the forthcoming ability to write genetic code to create new kinds of life forms from scratch, opening a vast potential for new kinds of synthetic bioweapons, a new regulatory environment should be considered. These developments, along with potentials for nanotech weapons, create unique problems of proliferation, health effects, environmental impacts, and post-conflict cleanups that are not well covered by international treaties. It seems inevitable that treaties governing such futuristic weapons – like treaties that were created for other kinds of weapons in the past – will be negotiated. The factors that make such weapons possible (such as improved computer chips, increased bandwidth, software, nano-engineering) are producing synergistic improvements at an accelerating pace. This makes their speed of development faster than might have been expected. [November 2006. [Military Implications, Sources](#)]

### **Promising Environmental-friendly Technologies**

[Clean Green Hydrogen-Making Process](#)

[New Generator Produces Hydrogen from Aluminum and Water](#)

[World Record solar cell efficiency achieved](#)

[Enzyme-based Biofuel Cells Using Nanotechnology](#)

[Photonic Crystal Provides 50% Cost Reduction](#)

[Refrigerator Temperature Sensor Mod Saves Energy](#)

[Printing Fuel Cells](#)

[Biologically Based Dyes Dramatically Lower Solar Cell Costs](#)

[New Solar Cell/Battery Combination Saves Size and Weight](#)

[Advanced Membrane Technology for Water Treatment to Counter Water Scarcity](#)

[New Device to Suck CO<sub>2</sub> from the Air](#)

[Smog-Eating Materials](#)

### **Clean Green Hydrogen-Making Process**

Lanny Schmidt, Brandon Dreyer and colleagues at the University of Minnesota's Department of Chemical Engineering and Material Science have developed a new process called "flash volatilization" that can turn waste biomass into hydrogen. It uses rhodium and cerium as chemical catalysts, is supposed to be 100 times faster than existing techniques, and is scalable. It generates a hydrogen and carbon monoxide gas mixture called synthesis gas, or "syngas" which can be used to make fuels, or its hydrogen can be separated in order to power fuel cells.

[December 2006, [Military Implications, Source](#)]

### **New Generator Produces Hydrogen from Aluminum and Water**

Prof. Jerry Woodall of Purdue University and associates have developed a new technique that uses aluminum-gallium alloy pellets to generate hydrogen from water, providing a novel source for the new "green fuel". Aluminum reacts with the oxygen in water, releasing hydrogen and transforming into aluminum oxide (alumina). The key to the new process is the use of gallium, which prevents the formation of a skin over the aluminum that would stop the process—with the

gallium, all the aluminum in a container can contribute to the reaction. The researchers envision that the alumina could be recycled back into aluminum by electricity derived from nuclear plants. The advantage of this indirect hydrogen fuel process is that aluminum is much more easily stored and transported than hydrogen, so there are potential gains in producing the hydrogen at the point of use in an “aluminum-fueled” engine. However, serious questions come to mind about the environmental effects and the overall cost and energy efficiency of producing and recycling the aluminum, and transporting it and the alumina, and about driving range with a feasible load of metal. This complex “non-rechargeable battery” will require much careful end-to-end analysis in order to gain acceptance, but it is an interesting approach. [May 2007. [Military Implications, Source](#)]

### **World Record solar cell efficiency achieved**

Spectrolab, a subsidiary of Boeing, announced the development of a new solar cell that can convert 40.7% of the sunlight into electricity. The conversion efficiency of today's conventional solar cells is between 12% and 18%. The Department of Energy claims that ‘this breakthrough may lead to systems with an installation cost of only \$3 per watt, producing electricity at a cost of 8-10 cents per kilowatt/hour, making solar electricity a more cost-competitive and integral part of our nation’s energy mix.’ [January 2007. [Military Implications, Sources](#)]

### **Enzyme-based Biofuel Cells Using Nanotechnology**

A team of Japanese scientists from Kyoto University in Japan has engineered carbon electrodes with carbon nanoparticles to develop a simple biofuel cell based on direct electron transfer-type bioelectrocatalysis. The cell uses enzymes to catalyze oxidation of D-fructose and reduction of dioxygen to generate electricity, without needing a mediator molecule. This might represent a significant development for simplifying the construction of biofuel cells. [February 2007. [Military Implications, Source](#)]

### **Photonic Crystal Provides 50% Cost Reduction**

StarSolar, in Cambridge MA, has developed a technology which allows a solar cell to produce the same amount of electricity with much less silicon, thereby cutting the cost of the energy by up to half, according to the developing organization, a licensee of MIT. The technique uses a so-called photonic crystal to reflect the incident light in such a way that more of it reaches the silicon layer, which can therefore be thinner. [March 2007. [Military Implications, Source](#)]

### **Refrigerator Temperature Sensor Mod Saves Energy**

The UK firm eCube Distribution Ltd., of Ilford, Essex, is marketing a device that modifies the operation of a refrigerator's temperature sensor in a way that may significantly reduce the unit's energy consumption. It consists of a wax sleeve that fits around the sensor and which has the thermal characteristics of a solid like food. An unmodified refrigerator senses the temperature of the air in the unit, rather than that of the contained food. When the door is opened, the temperature of the air rises rapidly, often triggering the cooling element to start, even though that of the food remains unchanged. The modified sensor causes cooling to be activated only when the temperature of the actual contents exceeds the preset limit. In a test in a hotel, where the



doors are frequently opened and closed, the device reduced energy consumption by 30%. [March 2007. [Military Implications, Source](#)]

### **Printing Fuel Cells**

EoPlex Technologies, in Redwood City, CA has developed a process, which allows the printing of three-dimensional structures with "ink" containing various materials, such as polymers, metals, and ceramics, layer by layer. Microreactors for chemical and drug processing, miniature fuel cells, wireless sensors, and thermal management systems are just some of the envisioned applications of this technology able to cheaply and easily create microscale devices. [October 2006. [Military Implications, Source](#)]

### **Biologically Based Dyes Dramatically Lower Solar Cell Costs**

Massey University's Nanomaterials Research Centre in Wellington, New Zealand, has developed a range of colored dyes for use in dye-sensitized solar cells that promises to lower costs by 90% compared to silicon-based photo-electric solar cells. The dyes are related to such organic molecules as chlorophyll and hemoglobin. The cells have the added advantage of working well in low-light environments. [April 2007. [Military Implications, Source](#)]

### **New Solar Cell/Battery Combination Saves Size and Weight**

A new family of batteries incorporating solar cells for self-charging is being developed by an international partnership of Konarka Technologies of Lowell MA, a maker of thin-film "plastic" solar cells, and the German company VARTA-Microbattery, which layered Konarka's technology onto a lithium-polymer battery. Not only are the new devices small and light, they also operate even at lower levels of illumination. [April 2007. [Military Implications, Source](#)]

### **Advanced Membrane Technology for Water Treatment to Counter Water Scarcity**

The Advanced Membrane Technology for Water Treatment project conducted under the auspices of the Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) seeks to develop advanced membrane technology for efficient, low energy processes to produce clean water from industrial and/or salt water resources, thus reducing the financial and environmental costs of addressing water scarcity problems. The research area consists of the following projects: low energy desalination membranes; membrane technology for industrial water reuse; and carbon nanotube (CNT) membranes. [May 2007. [Military Implications, Source](#)]

### **New Device to Suck CO<sub>2</sub> from the Air**

Towers with materials that absorb carbon dioxide (CO<sub>2</sub>) directly from the air and then release it as a pure stream of carbon dioxide for sequestration have been developed by scientists from Columbia University and Global Research Technologies, LLC. It is estimated that if these devices had openings 10 meters by 10 meters they could each extract about 1,000 tons each year; hence, one million of these units could remove 1 billion tons of CO<sub>2</sub> from the air per year. These could be placed at the best locations for carbon sequestration, regardless of carbon source. [April 2007. [Military Implications, Sources](#)]

### **Smog-Eating Materials**

Environment-friendly materials such as "smog-eating" products are increasingly in demand by architects and are developed not just for the façades of buildings, but also for paint, plaster, and paving materials for roads. An EU initiative for "smart" antipollution materials has found that construction products containing titanium dioxide help to destroy air pollutants found in car exhaust and heating emissions. The new environment-friendly substances are being tested in buildings, squares and highways in Europe as well as Japan. [November 2006. [Military Implications, Source](#)]



## 1.B Preventing or Responding to Environmentally Caused Conflicts

### MIGRATION TRIGGERED BY ENVIRONMENTAL CAUSES

#### Climate Change Refugees

Janos Bogardi, director of the UNU Institute for Environment and Human Security, called for the UN to create a legal framework to address future environmental refugees, while taking into account fears that by including environmental migrants in the international legislation protecting refugees, “we are weakening one of the strongest tools for protecting refugees.” Hence, the UN “should find other means of helping environmental migrants.” He also emphasized that environmental factors often lie at the root of more obvious causes of migration.

Christian Aid estimates that a billion people might be forced to migrate over the next 50 years, mostly as a consequence of environmental conditions. The vast majority will be from the world’s poorest countries, the Sahara belt, south Asia, and the Middle East. Their report estimates that in 2007 there are 25 million displaced by conflict and human rights abuses, 25 million by natural disasters, such as earthquakes, and 105 million by large development projects, with 8.5 million now officially recognized as refugees. By 2050, it says, 250 million could be permanently displaced by climate change-related phenomena.

Bangladesh, with its 140 million people, is one of the most vulnerable places to climate change. It is likely to face increasingly violent storms, saltwater getting further into the country’s rivers, erosion in the coastal areas, severe droughts in the north, and possibly a fifth of the country vanishing under water, if sea level rises by 3 feet by the end of the century. “One island here has more people than all of the small island states put together,” said Atiq Rahman, executive director of the Bangladesh Center for Advanced Studies. [May 2007. [Military Implications, Sources](#)]

#### Conference on Desertification Calls for Policies to Address Environmental Refugees

The UN International Year for Deserts and Desertification concluded with a Conference held in Algiers, Algeria, December 17-19, convened by the Canadian-based UNU International Network on Water, Environment and Health (UNU-INWEH), with ten other international agencies and hosted by the Algerian government. About 200 experts from 25 countries discussed policies to address desertification and its consequences, including health, economic, and environmental refugee-related issues. UN experts estimate that desertification threatens 2 billion people and could create more than 135 million refugees. In Africa, if current trends of soil degradation continue, the continent might be able to feed just 25% of its population by 2025, according to Karl Harmsen, Director of UNU’s Ghana-based Institute for Natural Resources in Africa. The international community should swiftly adopt adequate policies both to counter the desertification trend and to address desertification-induced migration. “Environmental refugees,” although not recognized yet in world conventions, are estimated to outnumber political refugees. [See also *International Year of Deserts and Desertification—2006* in January 2006, and *Desertification Synthesis (MA report 3)* in June 2005 environmental security monthly reports.] [December 2006, [Military Implications, Sources](#)]

## **Rising Sea Levels Claim First Inhabited Island and Threaten Coastal Populations Worldwide**

Scientists emphasize that extreme scenarios—as effects of climate change—have to be integrated into the decision-making process. Latest estimates by climatologist Stefan Rahmstorf of the Potsdam Institute for Climate Impact Research show that the world's oceans may rise up to 140 cm (4 ft 7 in) by 2100 due to global warming, considerably higher than the 9-88 cm projected by IPCC. His study is based on air temperatures and past sea level changes rather than computer models. The scientist underlines that the different results obtained “with reasonable methods” show the serious uncertainty concerning sea level forecasts; however, there is compelling evidence that shore communities are particularly at risk.

Rising sea levels have submerged two islands in India's part of the Sundarbans—where the Ganges and the Brahmaputra rivers empty into the Bay of Bengal—and a dozen more islands in the area are at risk, threatening nearly 100,000 people who will have to be evacuated in the next decade. Lohachara, which had a population of 10,000 people, is the first inhabited island to disappear due to rising seas caused by global warming. The people of the Carteret Islands off Papua New Guinea also live under the continuous fear of stronger and more frequent rising tides threatening their entire livelihood and eroding their land. The islands are expected to disappear in about eight years. Similarly, whole island nations, from the Maldives to the Marshall Islands, vast areas of countries from Bangladesh to Egypt, and many coastal cities are at risk as sea levels continue to rise. In Alaska, 184 out of 213 native villages are at some point affected by erosion and flooding due to global warming, threatening the culture and the very survival of the inhabitants. [See also *Rising Sea Level Triggers Rising Refugee Move* in April 2006, *Rising Concerns over Rising Seas* in February 2006, and other previous environmental security reports.] [December 2006. [Military Implications, Sources](#)]

## **Increasing Weather Extremes and Environmental Refugees due to Climate Change**

There might be 200 million climate refugees by 2050, which could increase the likelihood of conflicts in many locations around the world. Experts warn that in addition to the South Pacific low-lying islands that are already affected, millions of people in densely populated countries such as Bangladesh and parts of China, Indonesia, and Vietnam might be forced to move by rising sea levels, while extreme drought might affect 10% of world land by 2050—five times more than now, and 30% by the end of the century (estimate by UK Met Office Hadley Centre). Another study, *Going to the Extremes*, based on advanced computer modeling, warns that by the century's end, the planet will face more weather extremes such as deadly heat waves, prolonged drought, and intense rainstorms due to global warming caused by human emissions of greenhouse gas. [October 2006. [Military Implications, Sources](#)]

## **Coastline Erosion due to Rising Sea Waters Signaled Around the World**

Coastline erosion as one of the effects of rising sea levels is increasingly felt around the world by low-lying communities. Hundreds of people are being displaced on the Carteret Islands, Papua New Guinea, and millions are threatened along the shorelines from Sri Lanka and Bangladesh, to coastal Louisiana and England. Experts warn that England's coastline erosion might accelerate as global warming leads to rising sea levels and harsh weather. Over the next century, half of the 1,125 kilometer coastline in the administration of the National Trust charity—Britain's largest owner of coastline—is expected to be severely affected by erosion. Lyme Regis in Southwestern

England is already threatened by rising seawaters that are carving away its harbor and coast. To this, should be added the increasing acidity of ocean waters—due to CO<sub>2</sub> levels that are over the ocean's natural buffering capacity—dissolving calcium and therefore severely affecting marine ecosystems, especially coral reefs that are the main support to many geologically new islands. [See also *Climate change—Research Documents Continued Global Warming Effects* and *Rising Sea Level Triggers Rising Refugee Move* in April 2006 and other previous environmental security reports.] [August 2006. [Military Implications, Sources](#)]

### **Economic and Security Implications of Climate Change**

The *Economics of Climate Change*, an authoritative report by Sir Nicholas Stern, former chief economist with the World Bank, warns that unless rapid action is taken globally to reduce emissions and tackle climate change within a decade, the world will face deep economic recession, with annual costs of climate change consequences ranging between 5% to 20% of the global economic output (about £3.68 trillion--approx. \$7 trillion US dollars). The report calls for a global framework on climate change that is flexible—considering different countries'/regions' specifics. Another report, *Africa—Up in Smoke 2*, by a coalition of UK aid agencies and environmental groups warns that climate change might annihilate efforts to tackle poverty in Africa and emphasizes the need for human progress and development models that are climate proof and climate friendly. Africa is already 0.5°C warmer than it was 100 years ago and temperature increases over many areas of Africa might be double the global average increase, worsening drought patterns and the strain on already feeble water resources, and therefore aggravating the security situation of the conflict-torn continent. As noted by UK Foreign Secretary, Margaret Beckett, climate change is not any longer just an environmental problem, but is “a defence problem. It is a problem for those who deal with economics and development, conflict prevention, agriculture, finance, housing, transport, innovation, trade and health.” [October 2006. [Military Implications, Sources](#)]

### **Developing Countries Most Affected by Global Warming**

Consequences of global warming are increasingly felt, mostly by developing nations. Rising sea levels force inhabitants of some South Pacific islands to relocate. The World Bank warns that development programs are jeopardized by climate change in many regions around the world and urges the international community to integrate climate risk concerns in development strategies. [September 2006. [Military Implications, Sources](#)]

### **Population and Resources Affecting the Risk of Conflict**

The *UN Population Prospects 2006 Revision* report reveals that most of the countries that top the birthrate list are those already affected by the world's worst wars. Growing pressure of people on land and resources is likely to exacerbate conflict in those areas. At a Woodrow Wilson Center event, ‘Demography and Conflict: How Population Pressure and Youth Bulges Affect the Risk of Civil War’, Henrik Urdal, Researcher at the Centre for the Study of Civil War, International Peace Research Institute, Oslo (PRIO), discussed the results of an empirical research on the links among global demographics and the potentials for civil unrest. Concluding that certain forms of population pressure—particularly youth bulges—increase the risk for conflict, he makes several recommendations for attempting to minimize conflict, including: measures to enhance local

resource management capacity; programs aimed at curbing population pressure, and more research focusing on youth bulges and political stability and conflict prevention.

Another Woodrow Wilson Center event, 'Climate-Security Connections: An Empirical Approach to Risk Assessment,' analyzed the potential relationship between environment and conflict by integrating environment data with conflict data and using the results to improve conflict risk assessments. The outcomes show that although environmental scarcity doesn't necessarily represent a cause of conflict, it might become an important reason in poor and war-torn societies or with other inter-group (horizontal) inequalities. Hence, it is important for preventing and mitigating escalating conflicts to map and watch different environmental anomalies that might lead to food and/or water scarcity and vice-versa and to identify conflict-prone zones that might be exposed to destabilizing environmental factors. Such a world map of areas worth watching for possible crises situations that might lead to conflict was presented. [March 2007. [Military implications, Sources](#)]

## **FOOD AND FRESHWATER**

### ***Living Planet Report 2006***

*Living Planet Report 2006*, by the WWF and the Global Footprint Network, reveals that humanity's impact on the planet has more than tripled since 1961 and Earth's resources are being used faster than they can be replaced by nature, and it warns that, if present trends continue, by 2050 humanity will demand twice as much as the planet can supply. The report breaks down the ecological footprint into components, such as CO2, food production needs, infrastructure requirements, etc. The countries with the highest ecological footprint are: the United Arab Emirates, U.S., Finland, Canada, Kuwait, Australia, Estonia, Sweden, New Zealand, Norway and Denmark. [October 2006. [Military Implications, Sources](#)]

### **Unless Water Management Improves, Conflicts over Water Are Inevitable**

The 16th annual conference on water took place in Stockholm, during World Water Week, August 20-26. Reports released during this week warned of possible consequences of future water scarcity, such as increased cost of water, civil unrest, mass migration, and economic collapse. There was consensus that poor management of water resources and soaring water usage are the main causes of water scarcity increasing worldwide faster than expected; and, unless there are drastic policy changes around the world, the grim statistics will only worsen, mostly in the densely populated and poor regions of China, Mexico, and India. A report by The World Wildlife Federation (WWF), Rich countries, poor water, warns that wealthy nations are threatened by a water crisis similarly to the drought-plagued poor countries, due to climate change, drought, loss of natural wetlands, and over-consumption by industry, agriculture and big cities. The report suggests seven ways to address the problem. The International Water Management Institute notes that while over the past 100 years water usage had increased six-fold, it is expected to double again by 2050.

The World Bank estimates that 20-40% of water sector finances are lost to corruption. Water experts and businesses formed the Water Integrity Network (WIN) to combat corruption in the water sector. WIN is open to all. Transparency International and water corporations are the initial

principal members. WIN seeks reforms to improve regulations and transparency, as well as increase public awareness.

*Asia's Coming Water Wars*, a comprehensive analysis by The Power and Interest News Report, warns of water problems increasing conflicts in some Asian regions already beleaguered by long-standing historical animosities and internal instabilities. The most vulnerable regions for water-related conflicts are Central Asia, South Asia and the Mekong sub-region in Southeast Asia. Considering these regions' rapid development, growing populations and instabilities, water-related tensions might have wider regional and global significance.

*Business in the world of water—WBCSD Water Scenarios to 2025* presents the critical future water situation in three "H2O" scenarios: "H" (Hydro)—urbanization, technical and efficiency-focused, with serious water allocation problems; "2" (Rivers) is a world of water security based on compromise; "O" (Ocean) describes a functional society based on interconnectivity and cooperation of all systems' actors. [August 2006. [Military Implications, Sources](#)]

## **Water Scarcity**

World Water Day theme in 2007 was 'Coping with Water Scarcity' to highlight limited water resources and the imbalances between availability and demand.' If today water scarcity affects 700 million people around the world, by 2025, this could rise to more than 3 billion. Since many of the world's rivers and aquifers are shared among countries, conflicts are likely to be exacerbated, unless integrated cross-border water management systems are implemented. Several reports released on the occasion of World Water Day reveal today's realities, suggesting policies and future possible developments. The WWF report, *World's Top Rivers at Risk*, warns that global warming and man-made causes destroy some of the world's largest rivers, threatening ecosystem and people's livelihood. The report assesses pollution, development, and water management of ten of the world's most important rivers: the Nile, the Danube, the Rio Grande, La Plata, Yangtze, Mekong, Salween, Ganges, Indus, and Murray-Darling. It is calling on policymakers to take notice of the emergency nature of the situation and to set up strategies to reverse damage to freshwater sources. "Conservation of rivers and wetlands must be seen as part and parcel of national security, health and economic success," stressed Jamie Pittock, WWF Global Freshwater Programme Director. The IPCC report *Impacts, Adaptation and Vulnerability*, forecasts that "hundreds of millions of Africans and tens of millions of Latin Americans who now have water will be short of it in less than 20 years. By 2050, more than 1 billion people in Asia could face water shortages. By 2080, water shortages could threaten 1.1 billion to 3.2 billion people, depending on the level of greenhouse gases that cars and industry spew into the air." The report will be released at the beginning of April. As Peru's glaciers are melting, the country might run out of water. In China, air pollution is causing reduced rainfall, increasing drought in northern China. [See also *World Water Forum 2006, Unless Water Management Improves, Conflicts over Water Are Inevitable*, and other previous environmental security reports on the water issue.] [March 2007. [Military Implications, Sources](#)]

## **OSCE Environmental Security Conference Focuses on Land and Water**

On January 22-23, 2007 the Organization for Security and Co-operation in Europe (OSCE) held a conference with the theme: "Key challenges to ensure environmental security and sustainable development in the OSCE area: Land degradation, soil contamination and water management." The speakers were a diverse mix of mostly European political, governmental, environmental, and



security experts, who further developed OSCE's role in environmental security for the region. Germany offered to take the leadership in environmental cleaning up of closed military facilities in the region. OSCE is composed of 56 countries. "The most significant issue presented was the critical rate of loss of arable lands in the arid regions of Eastern Europe. Experts from these countries requested urgent assistance from the OSCE to stem this impending crisis," said Dr. King of the U.S. Army Command and General Staff College, who led the first panel.[January 2007. [Military Implications, Source](#)]

### **Proposal for Recognizing Water as a Basic Human Right**

The declaration of the first Meeting of the Parties to the Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes includes a paragraph on water as a basic human right. The meeting adopted several decisions, mostly related to the implementation and compliance procedures of the Protocol, transparency, and involvement of local authorities into the Protocol's implementation at early stage. The European ECO-Forum proposed the development of guidelines for governments (national and local authorities) to help in the implementation of the Protocol and urged that they be adopted at the Second Meeting of Parties that would be hosted by Romania in 2010. The first meeting was held January 17-19, 2007 at the Palais des Nations, in Geneva, Switzerland. The Protocol entered into force on August 4, 2005 and as of January 2007, has been ratified by 21 countries. [January 2007. [Military Implications, Sources](#)]

### ***Global Risk 2007, the World Economic Forum***

*Global Risks 2007; A Global Risk Network Report* by the World Economic Forum (WEF) explores three risk scenarios: Pandemic and Its Discontents; Out of the Global Warming Frying Pan (and Into the Fiscal Fire), and Oil Shock and Its Consequences. It also addresses policy issues related to mitigation and risk prioritization, the risk of water shortages, tropical storms and inland flooding, international terrorism and civil war. The report warns that climate change could cause up to \$250 billion loss over the next 10 years, and a sharp increase in oil prices could cause up to \$1 trillion of economic losses and trigger a global recession. [January 2007. [Military Implications, Sources](#)]

### ***State of the World 2007: Our Urban Future***

Worldwatch Institute's *State of the World 2007: Our Urban Future* warns of possible perils from urbanization, if policies, technologies, and behaviors are not changed. The report assesses social and economic impacts of rapid urbanization, and suggests policies. (50% of the world is expected to be urban within a year.) The chapter Reducing Natural Disaster Risk in Cities notes that of the 33 cities projected to have at least 8 million residents by 2015, at least 21 are coastal cities that will be affected by possible sea-level rise due to climate change. [January 2007. [Military Implications, Source](#)]

### ***GEO Year Book 2007***

UNEP fourth annual report, *GEO Year Book 2007*, was released at the opening of the Global Ministerial Environment Forum in Nairobi [see item *Governing Council/Global Ministerial Forum Makes Progress on Global Environmental Governance*]. The report offers a

comprehensive overview of global and regional developments over the past year; focuses on implications of globalization on the environment (linkages among ecosystem health, human well-being, and economic development and assesses how policy decisions respond to global change); analyses the environmental implications of nanotechnology; and features several key indicators related to the environment. [February 2007. [Military Implications, Source](#)]

## **NATURAL DISASTERS**

### **Fourth Assessment Report Climate Change 2007**

The first part of the four-volume *Climate Change 2007, the Fourth Assessment Report* of the Intergovernmental Panel on Climate Change (IPCC) will be released on February 2, 2007. News released in advance shows that climate change could be far worse than previously expected. A report on this first part of the IPCC Assessment will appear in next month's environmental security report. The other three parts of the Assessment focus on: impacts, adaptation and vulnerability to climate change—to be released in April; mitigation—to be released in May; and the Synthesis Report—to be published in November 2007. [January 2007. [Military Implications, Sources](#)]

### **International Early Warning Programme to Begin Operations**

The First Advisory Group Meeting of the International Early Warning Programme (IEWP) was held March 26-27, at the UN Campus in Bonn, Germany. Relevant representatives from 20 specialized UN agencies attended the meeting to set a framework for the program's operations, discussing the best strategies to help mitigate the impact of natural disasters—from earthquakes, tsunamis and hurricanes to floods and wildfires—and to decide how the early warning system could be implemented worldwide. The outcomes of the meeting were not yet available at the time of this writing. [See also *Tsunami Warning and Mitigation System in the Indian Ocean*, and other related items in previous environmental security reports.] [March 2007. [Military Implications, Sources](#)]

### **Global Security linked to Climate Change**

“Violence within and between communities and between nation states, we must accept, could possibly increase, because the precedents are all around”, warned Sir Crispin Tickell, Britain's former ambassador to the UN at the recent London conference, *Climate Change: the Global Security Impact*, hosted by the Royal United Services Institute. Security and climate experts assessed the impact of global warming on world security, noting again that in many cases, climate change consequences happen in already conflict-torn regions. Poverty and despair will increase as millions of people around the world are threatened by desertification, poor fresh water conditions, and rising sea levels. Unless global efforts to accommodate these people increase, the risk of conflict and terrorism grows. At the Economic Forum of Davos, there was a workshop on climate change and security, where panelists discussed the undeniable consequences of climate change on global security. [January 2007. [Military Implications, Sources](#)]

## **Worldwatch Institute: Assessing the Relation between Disasters and Conflict**

*Beyond Disasters: Creating Opportunities for Peace*, a report by Worldwatch Institute: analyses the nature and effect of disasters over the past 20 years and the impacts of human activities on the climate; highlights the factors of vulnerability; and makes a few recommendations to reduce the social consequences of disasters and to eventually use post-disaster reconstruction as an opportunity for building lasting peace. The report considers three case studies: Aceh, 2004 Indian Ocean tsunami—that became a catalyst for peace; Sri Lanka—despite the ceasefire, the conflict continued mainly because of an inadequate post-disaster reconstruction strategy; and Kashmir—the earthquake didn't influence the stalled reconciliation process. [June 2007. [Military Implications, Source](#)]

## **Adaptation and Vulnerability Report by the IPCC**

The Intergovernmental Panel on Climate Change (IPCC) report *Climate Change 2007: Impacts, Adaptation and Vulnerability* reinforced the scale of the implications of climate change and focused the international community on the emergency of acting on mitigation and adaptation strategies. The report shows that the most severe impacts of climate change will be experienced by people in the poorest regions who have emitted the least amount of greenhouse gases. Billions of people would face water scarcity and hundreds of millions, hunger. Vulnerability to climate change could be exacerbated by other stresses—such as poverty, unequal access to resources, and conflict. Africa will be mostly affected by water and food shortage; low-lying areas worldwide are threatened by floods, erosion, and rising sea levels; changes in precipitation patterns and the disappearance of glaciers from Asia to Latin America will affect water availability for human consumption, agriculture and energy generation; heat waves, forest fires, and extreme weather conditions will increase mainly in North America and Europe. “These projected impacts tell us that we urgently need to launch an agreement on future international action to combat climate change, as well as look for effective ways to generate the funds needed for adaptation,” says Yvo de Boer, executive secretary of the United Nations Framework Convention on Climate Change. The “Summary for Policymakers” suggests that a portfolio of adaptation and mitigation measures is needed to diminish the risks associated with climate change. The Summary, approved by government officials, will most probably guide future strategies such as a post-Kyoto policy, and establishing global mitigation and adaptation frameworks. The third report, *Mitigation of Climate Change* is scheduled for release in May, and the final Synthesis Report for November 2007. [April 2007. [Military Implications; Sources](#)]

## **Population Trends and Environmental Impact**

### U.S. National Report on Population and the Environment

U.S. National Report on Population and the Environment by the Center for Environment and Population (CEP) is the first comprehensive assessment of the impact of U.S. national and regional population trends on the environment. The report addresses the main “America’s Population-Environment Challenges”: land use; water; forests; biodiversity; fisheries and aquatic resources; agriculture; energy; climate change; and solid and toxic waste. It highlights that from 1995 to 2005, the U.S. population increased by 10.6% (29 million people)—the highest rate of industrialized countries—and raises concerns over environmental consequences, since the U.S. already has the largest per-capita environmental impact in the world. It warns that in the future



the situation might become more critical due to uneven distribution of the population, climate change, rising sea levels, and pollution.

#### World Population in 2025

Mapping Future Population Growth by the Earth Institute at Columbia University is mapping projected population change for the year 2025. It notes that most population growth will continue to be in already densely populated developing countries like India and China, and coastal population will increase by 35%, to 2.75 billion people living within 60 miles of the ocean; therefore, there will be increasing vulnerability to disasters resulting from climate-change and rising sea level. [September 2006. [Military Implications, Sources](#)]

#### **Indian Ocean Tsunami Warning System Declared Operational, but Local Coordination still Lacking**

At the end of June, UNESCO announced that the Indian Ocean tsunami warning system, coordinated by its Intergovernmental Oceanographic Commission, is on schedule to become operational for the entire region by the end of July. A network of 26 national information centers will allow countries to receive and distribute warnings of potential tsunamis. However, the tsunami that struck Indonesia on July 17th, caused by an earthquake off the south coast of Java, killed more than 500 people. Although the wave hit the coast 40 minutes after the quake was detected, no warning was issued to the population. [See also *Tsunami Warning and Mitigation System in the Indian Ocean* in December 2005, and other related items in previous environmental security reports.] [July 2006. [Military Implications, Sources](#)]

#### **Indian and Chinese Assessments of Climate Change Consequences**

Indian and Chinese authorities have increased warnings on the consequences of global warming on the coastal areas. In India, the National Coastal Zone Management Authority notes that millions of people living along India's 3,700 km (2,300 mile) eastern coast are vulnerable to storms, flooding and tsunamis; sea levels in some parts of the Bay of Bengal were rising at a rate of 3.14 mm annually, while off the coast of Khulna in Bangladesh the rate is 10 mm every year, and rising sea levels are eroding 1 meter (3.2 feet) of land every year along the coast of West Bengal state. India plans to conduct a study next year on how to mitigate the vulnerability to climate change of its 7,500 km (4,660 mile) coastal area. The first Chinese official National Climate Change Assessment also warns on devastating consequences of climate change on the Chinese economy (mainly agriculture) and increasing vulnerability of its coastal areas. Nevertheless, economic development remains the country's primary task, neglecting radical measures to address greenhouse gas emissions and pollution, states a report. [April 2007. [Military Implications, Sources](#)]

#### **China to Launch Climate Adaptation Program**

China is preparing to launch its first four-year comprehensive national program to address the effects of climate change on China. The program, to be launched in two months, will outline goals for reducing emissions of greenhouse gases and developing green technologies, and mitigation measures to address the implications of global warming on China's food production and on coastal cities. A comprehensive report, produced by six Chinese academic and government organizations, warns that because of continuous temperature rise, China's grain

production might be reduced by up to 37% in the second half of this century, and water scarcity increase considerably due to rapidly melting glaciers. [February 2007. [Military Implications, Sources](#)]

### **Indigenous Peoples Highly Vulnerable to Climate Change**

An international symposium at Oxford University focused on the threat of climate change to the world's indigenous peoples. They have already begun feeling the consequences of climate change and in some cases their whole way of life has to change radically, as they depend directly on natural resources threatened by global warming. It was agreed that indigenous communities have to work together with scientists and decision makers for designing and implementing adaptation measures for preventing possible catastrophic consequences of global warming on their people. [April 2007. [Military Implications, Sources](#)]

## **ENERGY SECURITY**

### ***World Energy Outlook 2006* Warns on Energy Security and Environmental Implications of Increasing Energy Demands**

The IEA's *World Energy Outlook 2006*, looking ahead to 2030, names two major issues facing the world over the next 24 years: the threat of "insecure" and "inadequate" energy supplies at reasonable prices, and environmental damages caused by increasing energy demands. The report also suggests that the solutions to these problems are cost effective and reiterates that investment in cleaner energy supplies and more efficient use of energy are vital to cutting energy demand by a significant margin – 10% by 2030. The report notes that energy demand will rise 53% by 2030 and increased nuclear energy and biofuel use are vital to cutting emissions. [November 2006. [Military Implications, Sources](#)]

### **EU Energy and Climate Change Policy**

The European Council adopted its new Energy Policy to reduce CO<sub>2</sub> emissions by 20% of 1990 levels by 2020— a target that could rise to 30% if the U.S., China, and other economic powers agreed to comparable reductions; and by 2020 to have 20% if its energy from renewable sources and 10% of its transport fuel be biofuels. The EU Conference of Presidents decided on March 15 to set up a temporary committee on climate change to provide clear information and suggest strategies to address the issue.

On March 28, the Commission unveiled its "green taxes" strategy that suggests splitting the EU-wide minimum excise duties into an energy tax and an environmental tax to reflect products' impact on the environment and encourage environmentally friendly goods. [See also EU Plans Tougher CO<sub>2</sub> Emissions Cuts in February 2007, and New European Energy Policy Developments in March 2006 environmental security reports.]

Britain's draft Climate Change Bill is pushing for a drastic emissions' reduction policy and could make the country the first to limit greenhouse gases by law. The proposal—to become law next year if it passes public and parliamentary consultation—stipulates that an independent panel should set a "carbon budget" every five years, with the goal to cut CO<sub>2</sub> emissions by 60% by 2050, from 1990 levels, and between 26% and 32% by 2020. Governments that miss the set target could be held liable. [March 2007. [Military Implications, Sources](#)]

### **European Action Plan on Energy Efficiency**

The European Commission outlined its Energy Efficiency Action Plan (EEAP) to cut Europe's energy consumption by 20% before 2020. It includes over 75 measures including new energy efficiency standards, and more energy-efficient products and services. The action plan will be introduced over the next six years and targets several priority areas, including: energy-efficiency labeling, possible legislation for meeting car emissions targets; encouraging investment in energy efficiency; more efficient power plants and energy transmission systems; and energy saving taxes and incentives. [See also *New European Energy Policy Developments* in March 2006 environmental security report.] [October 2006. [Military Implications, Sources](#)]

### **China's Climate Change and S&T Action Plan**

China launched its first national climate change program in June 2007. Although it does not include mandatory caps on emissions, it shows a strong commitment to reducing greenhouse gas emissions. The program highlights some major targets and actions to achieve them by 2010: reducing energy consumption by about 20% per GDP unit; increasing the share of renewable energy to 10% of the primary energy supply; keeping emissions of nitrous oxide from industrial processes at 2005 levels; increasing reforestation by 20%, and increasing international cooperation. The program notes that "China's energy efficiency is about 10% lower than that of the developed countries, and its per unit energy consumption of energy-intensive products is about 40% higher than the advanced international level. Science and technology are the ultimate resort for humankind to tackle climate change." In view of this, the Chinese Ministry of Science and Technology has released an action plan for the science and technology (S&T) aspects of China's new climate change initiative.

Note: The Chinese State Environmental Protection Administration report released in June reveals a continuous deterioration of air and water quality in Chinese cities despite national efforts to reduce pollution levels. Concomitantly, preliminary estimates by the Netherlands Environmental Assessment Agency reveal that in 2006 China surpassed the U.S., becoming the world's largest CO<sub>2</sub> emitter. [June 2007. [Military Implications, Sources](#)]

## 1.C Protecting the Environment Due to Its Inherent Moral Value

### ENVIRONMENTAL SECURITY-RELATED INTERNATIONAL REGULATIONS THAT HAVE BEEN OR ARE CLOSE TO COMING INTO FORCE SINCE JUNE 2006

#### **REACH Entered into Force on June 1, 2007**

The EU chemicals law, Registration, Evaluation, Authorization and Restrictions of Chemicals (REACH) entered into force on June 1. The law's managerial body, the European Chemicals Agency (ECHA) in Helsinki, officially began its operations. REACH is regulating the manufacturing, marketing, import, and use of all chemicals in the EU through a single system. The chemicals have to be registered over the next 11 years with the ECHA. REACH will significantly improve protection of human health and the environment while encouraging innovation and keeping the EU's chemical industry competitive. "[REACH] is the most progressive chemicals legislation in the world," said EU Environment Commissioner Stavros Dimas. [June 2007. [Military Implications, Sources](#)]

#### REACH, Europe's Chemical Regulations to Enter into Force on June 1, 2007

The REACH regulation (Registration, Evaluation, Authorization and Restriction of Chemicals) was approved by the European Parliament and the European Commission and will enter into force on June 1, 2007. REACH is regulating the manufacturing, marketing, import, and use of some 30,000 chemicals and is replacing 40 existing pieces of legislation, thus creating a single system for all chemicals in the European Union. The chemicals have to be registered over the next 11 years with the new European Chemicals Agency (ECHA) in Helsinki, which will be responsible for management of the new requirements. [See also International Controversies over REACH in June 2006, Integration of Chemical Regulations (REACH) Approved by European Council in December 2005, and other related items in previous environmental security reports.] [December 2006, [Military Implications, Sources](#)]

#### **Canadian Chemical Plan May Go beyond REACH as Environmentalists Get New Political Support**

The Canadian government has launched a plan to regulate the use of chemicals harmful to human health and the environment. Although the initial plan targets only 200 chemicals for regulation over the next four years, more could be added to eventually go beyond initiatives in Europe and the U.S. The Canadian efforts to strengthen such environmental policies will be improved by election of Stéphane Dion (former Environmental Minister) this month as the Liberal Opposition Leader. Sources report a rising environmental tide among the public. Previous negotiations for regulations mostly related to climate change, but pollutants are also expected to be revived as the Conservatives' efforts in the environment arena are strongly criticized by the other parties, citizens, and the international community. [Note: This month, the Secretariat of the Commission for Environmental Cooperation (CEC, NAFTA's "environmental arm") issued a determination requesting a response from Canada to a submission asserting that Canada is failing to effectively enforce the federal Species at Risk Act.] [December 2006, [Military Implications, Sources](#)]

### **Protocol V on Explosive Remnants of War (ERW) of the Convention on Certain Conventional Weapons came into force on 12 November 2006**

Protocol V on Explosive Remnants of War (ERW) of the Convention on Certain Conventional Weapons came into force on 12 November 2006, almost three years after it was adopted. The Protocol stipulates that Parties should take “remedial measures to mark and clear, remove or destroy unexploded ordnance or abandoned explosive ordnance” as early as possible after hostilities have ended, whether they control the territory or not, by cooperating directly or indirectly with all parties involved through quick and accurate information exchange. The Protocol is not retroactive, covering only wars occurring after its entry into force. As of the end of November, there were 27 States Parties to the Protocol.

The Portfolio of Mine Action Projects 2007 found that 26 out of 29 war-ravaged countries or territories surveyed are beleaguered with the lurking remnants of cluster bombs and other explosives. In 2007, the focus of the Projects will be on unexploded ordnance, aiming to deal with the aftermath of conflicts that took place before Protocol V entered into force. [November 2006, [Military Implications, Sources](#)]

### **UN Nuclear Terrorism Convention Enters into Force on July 7, 2007**

The International Convention for the Suppression of Acts of Nuclear Terrorism enters into force on July 7, 2007; about two years after Member States adopted it, in April 2005. It is one of the measures to reduce risks posed by nuclear, biological, and chemical weapons, and is the 13th international instrument on terrorism. The Nuclear Terrorism Convention creates an international legal framework that will help countries enhance their nuclear security and collaborate to prevent terrorist groups from gaining access to nuclear material. It should also add strength to the Global Counter-Terrorism Strategy. As of the end of June, the Convention has 115 signatories and 23 Parties. [June 2007. [Military Implications, Sources](#)]

### **European Environmental Liability Directive Came Into Force**

The Environmental Liability Directive establishes a comprehensive framework on liability for damage to the environment, based on the “polluter pays” principle. It aims to ensure that the financial liability for environmental damage prevention or remediation falls on the polluters who caused it, rather than on the taxpayers. Operators are financially responsible for ensuring that they have preventive or remedial measures. When the environmental situation involves more than one member state, then they must cooperate on the necessary preventive or remedial actions. The Directive was adopted in April 2004 and member states were supposed to bring into force the appropriate laws and regulations by April 30, 2007. [See also *European Union Polluter Pays Law*] [April 2007. [Military Implications, Sources](#)]

### **European Directive on Ship-Source Pollution Became Effective on April 1, 2007**

Directive 2005/35 on ship-source pollution and the introduction of penalties for infringements became effective April 1, 2007 across all 27 EU member states. The Directive introduces application of criminal penalties for gross negligence or illegal discharges of polluting substances at sea. It came into force in October 1, 2005 with implementation on March 1, 2007, and the EU member states were obligated to incorporate it into their national laws by March 31,

2007. Note: by 2011, the International Maritime Organization will require all ships to be equipped with a voyage data recorder, similar to the black box on an aircraft. This will greatly help the new directive's enforcement. [See also *Political Agreement Reached on the European Marine Strategy Directive, Europe to Harmonize Marine Pollution Legislation*, and *International Maritime Organization (IMO) wants global rather than many different local or regional rules*] [April 2007. [Military Implications, Sources](#)]

### **EU New Directive on Air Pollution**

A new air quality directive approved by the Environment Council is fixing an annual concentration limit for fine dust particles (known as PM2.5) to 25 micrograms per cubic meter averaged over a year, with effect from 1 January 2015 and will require Member States to reduce people's exposure to this group of particles by 20% between 2010 and 2019. The new directive would not change existing air quality standards for other pollutants but would give Member States more flexibility in meeting some of these in zones where they face difficulties. [See also *EU Thematic Strategy on Air Pollution for the CAFE Programme* in September 2005, and *The European Union Environmental Initiatives* in January 2005 environmental security reports.] [October 2006. [Military Implications, Sources](#)]

### **Europe to Begin Penalizing Jet Pollution in 2011**

The European Commission is moving forward with its proposal for a directive to bring civil aviation into the EU Emissions Trading Scheme (EU ETS) by imposing extra charges on highly polluting carriers. The legally binding rules will apply to all flights within the EU starting in 2011, and from 2012 to foreign carriers landing and taking off from European airports. [See also *Europe to Propose Emissions Targets for All Flights To/From or Within Europe* in November 2006 and *EC Proposed Strategy to Curb Greenhouse Gas Emissions from Air Travel* in September 2005 environmental security reports.] [December 2006. [Military Implications, Sources](#)]

### **November 2006: Europe to Propose Emissions Targets for All Flights To/From or Within Europe**

The European Commission is proposing to introduce a new policy that would impose emissions controls on all flights within and coming into Europe, seeking to strengthen pollution reduction regulations around the world. The proposal, expected to be presented around December 20, requires airlines to meet emissions targets starting January 1, 2011, for all flights within Europe and round-trips to the European Union from any other part of the world. The proposal also outlines a system and timeframe for airlines to buy carbon credits. [See also *EC Proposed Strategy to Curb Greenhouse Gas Emissions from Air Travel* in September 2005 environmental security report.] [November 2006. [Military Implications, Sources](#)]

### **July 2006: Europe Considers Aviation Policies to Reduce Greenhouse Gases**

The European Parliament is increasing its discussions on the impact of aviation on climate change, considering introducing kerosene taxes, and having the industry join the Kyoto Protocol-induced obligations. The World Travel & Tourism Council opposes such measures, which—they say—do not take into consideration the larger picture of the challenges which need to be managed, including jobs, economic impact, and even a negative effect on pollution. [July 2006, [Military Implications, Sources](#)]



## **EU to Introduce New Regulations to Combat Surface Waters Pollution**

The European Commission has proposed new rules regulating the amount of chemicals and toxic substances seeping into the continent's surface waters. The new regulation will apply to the 25-nation bloc, and would set new limits on the concentration levels of 41 hazardous chemicals in rivers, lakes and coastal waters. The directive, if approved by member states and the European Parliament, would require EU nations to "achieve the proposed limits for all priority substances by 2015 and cease discharges and emission of priority hazardous substances into water by 2025," says the Commission statement. [July 2006. [Military Implications, Sources](#)]

## **China Issues Electronic Waste Rules**

The Chinese State Environmental Protection Administration has issued new rules to require manufacturers, retailers and users to take responsibility for electronic waste. The rules are partly inspired by China's thriving (and illegal) industry of importing electronic waste and scavenging it in occupationally unsafe small or family workshops. [See also *Global Environmentally Sound E-waste Disposal System is Needed* in November 2005 environmental security report.] [August 2006. [Military Implications, Sources](#)]

## **PROPOSED TREATIES AND/OR CHANGES TO EXISTING ONES**

### **Toxic Waste Management**

#### **UN E-Waste Forum and Basel Convention's Conference of Parties**

Electronic devices account for 20-50 million metric tons of waste per year around the world that introduce lead, cadmium, mercury and other hazardous wastes into the land and water supplies. To counter the acceleration of this problem, over 500 experts from more than 150 countries met at the UN offices in Nairobi, Kenya, November 27–December 1 for the Conference of the Parties (COP8) to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. The conference theme was "Creating innovative solutions through the Basel Convention for the environmentally sound management of electronic waste." An e-waste declaration and more than 30 decisions were adopted, including synergies and cooperation among the Basel, Rotterdam and Stockholm Conventions (UNEP/CHW.8/CRP.8), safer ship dismantling procedures, amendments to the guidelines for the environmentally sound management (ESM) of persistent organic pollutant wastes, the 2007-2008 program, and implementation of the Strategic Plan for the Implementation of the Basel Convention to 2010. The E-waste Declaration called for wider transfer of information on technologies and e-waste management from developed to developing countries, prevention and fighting e-waste trafficking, introduction of broader and stronger national legislation to control e-waste management, promotion of eco-friendly technologies and phasing-out toxic components, and raising awareness of e-waste issues and integrated systems to reduce and limit damage due to e-waste. The meeting also discussed environmentally sound management of ship dismantling and agreed to a draft ship recycling convention, as well as the need for greater guidance in managing abandoned ships. The next COP will take place in fall 2008, in Indonesia. [See also *Toxic Waste Disposal of Global Growing Concern* in September 2006, *Basel Convention on Hazardous*



*Wastes to be Made More Effective* in July 2005, and other related items in previous environmental security reports.]

[Note: By 2010, an estimated 100 million phones and 300 million personal computers might become waste. In the U.S., it is estimated that 14–20 million personal computers are thrown out each year; developing nations are expected to triple their output of all electronic waste by 2010.] [December 2006, [Military Implications and Sources](#)]

### **European Parliament Proposes Tougher Waste Management Strategy**

The European Parliament has voted for a tougher waste management strategy, which stipulates that EU production of waste should be stabilized at 2008 levels by 2012, and scaled back by 2020, requiring that 50% of municipal waste and 70% of industrial waste be recycled by 2020. Although the new directive would not impose firm obligations on member states it would establish a "general rule or guiding principle" influencing future waste management practices. EU member states have different waste management strategies and efficiency and are expected to fight the Parliament's proposal. [See also *EU New Strategy on Waste Recycling in December 2005*, *New EU Environmental Strategies in September 2005*, and *Recycling Regulations in the EU* in August 2005 environmental security reports.] [February 2007. [Military Implications, Sources](#)]

### **Toxic Waste Disposal of Global Growing Concern**

The scandal around the dumping of toxic waste at Abidjan, Ivory Coast has intensified the global debate concerning trade in waste and the adequacy of the Basel Convention. Some African and Asian countries became dumping grounds for hazardous waste, such as radioactive uranium waste, lead, cadmium, mercury, industrial and hospital chemicals, and the rising volume of electronic waste. Although the Basel Convention and its 1995 amendment ban dumping of toxic waste in countries without proper facilities for handling it, the process continues illegally in countries that are not party to the Convention. In addition to environmental and health consequences, a Senegalese ecologist points out the security aspect associated with illegal dumping since "the waste is often accepted by corrupt people or factions who want money to buy weapons". As a consequence of the Ivory Coast scandal, the Prime Minister dissolved his cabinet and elections are jeopardized in a country already tormented by conflicts. [See also *New Measures for Regulating E-waste* in August 2006, as well as *Basel Convention on Hazardous Wastes to be Made More Effective* in July 2005 and other related items in previous environmental security scanning reports.] [September 2006. [Military Implications, Sources](#)]

### **Chemical and Biological Safety**

#### **UN Nuclear Terrorism Convention Enters into Force on July 7, 2007**

The International Convention for the Suppression of Acts of Nuclear Terrorism enters into force on July 7, 2007; about two years after Member States adopted it, in April 2005. It is one of the measures to reduce risks posed by nuclear, biological, and chemical weapons, and is the 13th international instrument on terrorism. The Nuclear Terrorism Convention creates an international legal framework that will help countries enhance their nuclear security and collaborate to prevent terrorist groups from gaining access to nuclear material. It should also add strength to the Global

Counter-Terrorism Strategy. As of the end of June, the Convention has 115 signatories and 23 Parties. [June 2007. [Military Implications, Sources](#)]

### **Stockholm Convention on POPs Adopts Evaluation but not Non-compliance Mechanisms**

The third meeting of the Conference of the Parties (COP-3) to the Stockholm Convention on Persistent Organic Pollutants (POPs) occurred April 30-May 4, 2007, in Dakar, Senegal, with over 450 participants representing more than 180 governments and international and non-governmental organizations. Twenty-two decisions were adopted, including: measures to reduce or eliminate releases from wastes (integration with the Basel Convention for developing a framework for environmentally sound waste disposal); guidelines on best available techniques and draft guidance on best environmental practices; improving the reporting system; evaluation of implementation effectiveness through the Global Monitoring Programme (establishing a coordination group formed of three representatives from each of the five UN regions); technical assistance; and non-compliance (negotiations to continue and mechanisms to be considered for COP-4). COP-4 will be held May 4-8, 2009, in Geneva, Switzerland. [May 2007. [Military Implications, Sources](#)]

### **Eleventh Chemical Weapons Convention**

The 11th Conference of States Parties to the Chemical Weapons Convention (CWC) was held in The Hague, December 5-8. One of the controversial issues discussed concerned “incapacitating agents,” which Peter Herby, head of the Mines-Arms Unit at the International Committee of the Red Cross, considered toxic chemicals. Some experts also argued that using “nonlethal” materials on the battlefield would violate the CWC. There was also a call to clarify which chemicals—other than riot control agents—are allowed under the treaty’s exception for law enforcement, and that all these chemicals be publicly declared. The Conference approved the requests from Russia, the U.S. and several other nations for additional time to eliminate their stockpiles of toxic agents. There are now 181 nations party to the CWC, representing about 98% of the world’s population and there are calls that all nations become Party to the Convention before its 10th anniversary, next year. [See also *Five Countries Organize CWC National Authorities* in May 2006, *Micro-reactors Challenge Chemical Weapons Convention Effectiveness* in August 2005, and *Chemical Weapons Convention Annual Conference* in December 2004 environmental security reports.] [December 2006, [Military Implications, Sources](#)]

### **Call for Reinforcements to Chemical Safety**

At the Fifth Session of the Intergovernmental Forum on Chemical Safety, held 25-29 September 2006 at Budapest, Hungary, policymakers and experts reinforced the need for applying the precautionary principle in the context of chemical safety; extending globally the regulations on heavy metals; and tackling the widening gaps among countries in following chemical safety policies. Prior to the Session, a side event was held on health and environmental concerns associated with heavy metals and global needs for further action. [See also *Stockholm Convention Updates* in November 2005, *First Conference of the Parties to Rotterdam Convention* in September 2004, *New Strategy for International Chemicals Management Launched* in November 2003, and other related items in previous environmental security scanning reports.] [September 2006. [Military Implications, Sources](#)]

### **Better International Controls Needed to Prevent Bioterrorism**

“The biological weapons threat is multiplying and will do so regardless of the countermeasures we try to take,” warns Steven Block, a Stanford University biophysicist and former president of the Biophysical Society. The likelihood of SIMAD (Single Individual Massively Destructive), motivated by ideology or personal issues, is increasing fast and there is no adequate international treaty (the Biological Weapons Convention is not enough) or oversight agency to prevent malicious use of biotechnology work. There is no monitoring of the expanding gene-synthesis industry and the supervision of controversial experiments is voluntary and irregular at universities and private laboratories around the world. While scientists are still arguing on what approach would be the best to increase protection against bioterrorism, they agree on the need for swift and intensified international control to impede the accidental or deliberate release of genetically modified organisms. Along the same lines, China has updated its 2002 list of controlled export materials that could be used to produce biological weapons to fight terrorism. The new list added 14 types of viruses, toxins, bacteria, and equipment, and strengthened export control. [July 2006. [Military Implications, Sources](#)]

### **Nuclear Nonproliferation Treaty Stalemate Continues**

No progress was achieved by the two-week annual session for preparing the 2010 NPT Review Conference. After having its work delayed for six days due to Iran’s disagreement with the agenda, the conference ended with disputes over the session’s final statement. Iran and other Nonaligned Movement nations criticized the statement as being too focused on compliance and not enough on the need for nuclear-weapon states to move toward disarmament. [See also *Review Conference of the Non-Proliferation Treaty*, and *Increasing Calls for Improved Management of Nuclear Materials and Nonproliferation*]

Meanwhile, eight more nations joined the Global Initiative to Combat Nuclear Terrorism. Led by Russia and the U.S., this global effort was initiated in 2006, to improve security over nuclear materials and to deter nuclear smuggling. The group now includes 31 nations. The next meeting is scheduled to be held in June, in Kazakhstan. [May 2007. [Military Implications, Sources](#)]

### **Pollution and Greenhouse Gases**

#### **2007—The International Year of the Ozone Layer**

The year 2007 is designated The International Year of the Ozone Layer, marking the 20th anniversary of the signing of the Montreal Protocol. Since its entry into force, January 1, 1989, the Montreal Protocol has undergone five revisions, the last one in 1999. “Perhaps the single most successful international agreement to date” (as noted by Kofi Annan, former UN Secretary-General), the treaty is widely adopted and implemented. Nevertheless, due to the accumulative effect, the ozone hole was the largest recorded last September. The next meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer will be hosted by Canada in Montreal, September 17-21, 2007. [January 2007. [Military Implications, Sources](#)]

## **Countries Contemplating Tougher Regulations for Mandatory Emission Targets**

In light of last month's report, *The Economics of Climate Change*, the UK announced its intention to introduce new "green" measures to reduce carbon emission, including the Climate Change Bill—to reduce CO<sub>2</sub> emissions by 60% by 2050, and to strengthen official monitoring and reporting. The UK also proposes to set an emissions reduction target of 30% by 2020, and at least 60% by 2050 Europe-wide. Australians polled would favor ratification of the Kyoto Protocol and more stringent reductions, and its government advocates an Asia-wide emissions trading system as part of a planned "new-Kyoto" pact and would invest US\$46.5 million into the world's biggest carbon capture and storage system. [Note: A proposal to allow Clean Development Mechanism (CDM) funds to be used for carbon capture and storage (CCS) projects was deferred by the Climate Change Conference on grounds that the technology is not yet mature.] Japan cannot meet its obligations under the Kyoto Protocol unless it imposes mandatory emission targets on industry and increases spending for carbon credits using Kyoto tools such as the Clean Development Mechanism. [See also *UK Proposes Individual Carbon Trading* in July 2006, *Possible Tougher European Carbon Limits* in May 2006, and other related items in previous environmental security reports.] [November 2006. [Military Implications, Sources](#)]

## **UK Proposes Individual Carbon Trading**

The UK Minister of the Environment has proposed a plan for individual carbon-trading procedures. Under the proposal, all UK citizens would be allocated a certain annual amount of carbon credits that will be reduced each time they purchase non-renewable energy. The points will be stored on an electronic card and those who did not use their full allocation would be able to sell their surplus carbon points into a central bank, while those who run out of points will be charged additionally at the point of sale for the equivalent of the missing points. To reduce total UK emissions, the overall number of points would be reduced each year. Details and the place for launching the pilot project should be announced shortly. If the new UK carbon-trading scheme proves feasible and efficient, it is likely that it will be emulated in other (if not all) EU countries and possibly even other regions of the world strongly committed to reducing their carbon emissions. [See also *Possible Tougher European Carbon Limits* in May 2006 and other related items in previous environmental security reports.] [July 2006. [Military Implications, Source](#)]

## **Energy Saving**

### **Ban on Incandescent Light Bulbs Expands**

As part of the plan to cut down on energy consumption and greenhouse gas emissions, the phase-out of incandescent bulbs expands. Canada is expected to introduce new regulations by the end of this year, requesting the phase-out of inefficient incandescent lighting in common uses be completed by 2012. Canada is the second country to introduce such a nationwide regulation, after Australia, where the ban is scheduled for 2009–10. [See also *Compact Fluorescent Light Bulbs (CFLs) May Surge to Fore, European Lamp Companies Push Compact Fluorescents, as Does the EU.*] [April 2007. [Military Implications, Sources](#)]

### **Compact Fluorescent Light Bulbs (CFLs) May Surge to Fore**

A bill to be introduced in the California legislature to ban the use of incandescent light bulbs by 2012, in favor of compact fluorescents, may presage a worldwide tendency in this direction. With global warming concerns burgeoning and CFLs using 75% less energy, this action by California (if it becomes law) could trigger similar measures around the world over the next few years. [February 2007. [Military Implications, Source](#)]

### **European Lamp Companies Push Compact Fluorescents, as Does the EU**

The European Lamp Companies Federation, whose members include the world's three largest light bulb manufacturers, has said they will push European consumers to switch to energy-saving compact fluorescent bulbs (CFLs). According to an AP dispatch, "The European Union is already encouraging its 27 member governments to promote the use of efficient lights on streets and in offices. The ELC Federation statement said its members 'urge the European Commission to adopt a similarly proactive approach to domestic lighting'." [March 2007. [Military Implications, Source](#)]

### **Post-Kyoto Protocol Negotiations**

#### **UN Climate Change Conference Explores Post-Kyoto Regulations**

The twelfth Conference of the Parties (COP 12) to the UN Framework Convention on Climate Change and the second Meeting of the Parties to the Kyoto Protocol (COP/MOP 2), as well as some 130 related side events took place in Nairobi, Kenya, November 6-17, 2006, attended by over 5,900 participants, including 2,300 government officials. The foci were on the future of the Protocol and the Convention, and longer-term action to combat climate change and cope with its consequences. The meetings resulted in the adoption of 10 COP decisions and 11 COP/MOP decisions and in the approval of a number of conclusions by the subsidiary bodies, but no agreements were reached on post-Kyoto cuts or a negotiations timetable. However, the governments recognized that there is compelling scientific evidence for global warming and thus global emissions need to be reduced 50% by 2050. At the insistence of the European Union, a thorough examination of the Protocol will take place in 2008. Important achievements include: a) establishment of the Least Developed Countries (LDC) Fund, Special Climate Change Fund (SCCF), and Adaptation Fund; b) launch of the Ad Hoc Working Group on Annex I future commitments; c) the Dialogue on long-term cooperative action to address climate change by enhancing implementation of the Convention; and d) the assignment of high priority to adaptation activities, mainly in developing countries. It is expected that, at next year's meeting, to be held in Indonesia, governments will start full negotiations for deeper cuts in emissions to keep the rise in global temperatures below the critical 2°C level. [November 2006. [Military Implications, Sources](#)]

### **Moves Forward on the Post-Kyoto Negotiations**



The European Environment Council agreed to significantly accelerate global negotiations for a post-Kyoto framework to reduce greenhouse gas emissions. It is ready to assume leadership for completing global negotiations by the end of 2009. [December 2006. [Military Implications, Source](#)]

Leaders attending the recent Heiligendamm (Germany) G8 summit agreed to seek “substantial” cuts in greenhouse gas emissions, and to launch negotiations at the December 2007 UN Summit for eventually reaching agreement on a new—more inclusive—UN-led treaty by 2009. EU, Canada, and Japan supported a target of a cut to 50% of the 1990 emissions level by 2050. [June 2007. [Military Implications, Source](#)]

Denmark began preparing for the 2009 UN climate summit that it will host. However, it admits that reaching a political agreement on a new global climate treaty to replace the current Kyoto Protocol will not be easy. [June 2007. [Military Implications, Source](#)]

Ahead of the September Asia Pacific Economic Cooperation summit, Australia's Prime Minister John Howard is seeking to launch negotiations for an Asia-Pacific new climate agreement and to use the summit for including emerging high emitters as China and India in a post-Kyoto accord. [June 2007. [Military Implications, Source](#)]

Norway plans to become the world's first “carbon neutral” country, by reducing its emissions to zero by 2050, or paying for equivalent reductions elsewhere. [June 2007. [Military Implications, Source](#)]

The UN Secretary General will hold a special high-level meeting on climate change prior to the September Heads of State and Government summit. He called climate change the “defining issue of our era.” [June 2007. [Military Implications, Source](#)]

### **Possible Tougher Policies Concerning Climate Change**

Environment ministers from around the world will meet next month (November 2006) in Nairobi, Kenya, for talks on post-Kyoto policies. Some want clearer timetables and frameworks on the next phase of greenhouse gases cuts. German Chancellor Angela Merkel wants to make addressing climate change a top priority on the agenda as she assumes the top position in both the G8 and the EU in 2007. She also wants to use Germany's presidency of the EU to push for the reduction of energy use, including bringing around the big greenhouse gases emitters that do not yet have adequate reduction policies. [October 2006. [Military Implications, Sources](#)]

### **Clean Development Mechanism (CDM) successful**

The UNFCCC Secretariat Director considers the Kyoto Protocol's Clean Development Mechanism (CDM) successful so far, with some 645 CDM projects being registered in 44 countries, covering a wide range of sectors. At the same time, he cautioned that serious negotiations on a post-2012 regime would only be launched at the Bali conference, and not concluded there, given experience with the Kyoto Protocol, which took two years to negotiate and another two to ratify and bring into force.

Australia's government is developing a carbon emissions reduction plan that would recommend a trading scheme built on the six-nation Asia-Pacific Partnership on Clean Development and Climate (which includes Australia, China, India, Japan, South Korea, and the U.S.) The proposal is planned to be put forward at the 2007 Summit of the Asia-Pacific Economic Cooperation to be held in Sydney, in September. [May 2007. [Military Implications, Sources](#)]

## **Biological Diversity**

### **New Sites Added to World's Protected Biosphere Reserves**

UNESCO added 25 new sites to the UN global network of protected biosphere reserves that are managed on sustainable development principles. The new additions include 18 sites in Mexico, three in Spain, one trans-boundary site shared between Spain and Morocco, and one in each of the Russian Federation, Viet Nam, and Malawi. UNESCO's network Man and the Biosphere (MAB) Programme now comprises 507 reserves in 102 countries. [See also *New Protected Ecological Sites* in July 2005 and other previous environmental security reports.] [October 2006. [Military Implications, Source](#)]

### **New Strategy of UNESCO World Heritage Committee for Heritage Sites and Climate Change**

UNESCO's World Heritage Committee is registering protected sites threatened by climate change. These sites will be monitored and actions will be suggested to prevent their damage from climate change. A policy document on the impact of climate change on World Heritage properties will be presented to the World Heritage Committee in 2007. Created in 1972, UNESCO's World Heritage List covers 812 sites around the world. Located in 137 countries, 628 of the World Heritage sites are cultural, 160 are natural and 24 are mixed. [See also *New Protected Ecological Sites* in July 2005, *Nine New Hotspots Added to World's Protected Areas* in February 2005, *Intensified Efforts Needed to Save Biodiversity* in January 2005, and related items on UNESCO World Heritage Sites in November and June 2004, and October 2003 environmental security monthly reports.] [July 2006. [Military Implications, Sources](#)]

### **International Polar Year 2007-2008**

The International Polar Year, the largest polar research program for 50 years, officially started on 1 March 2007 and will involve thousands of scientists, from more than 60 countries, working on 220 projects focused on the Arctic and Antarctic regions. Its purpose is to enhance the understanding of physical, biological and social processes of those regions, and Earth's climate and ecosystems. The outcomes are expected to improve assessments and forecasts, and eventually generate recommendations for further research and policies. In 2009, after the IPY ends, ESA will launch the Cryosat 2 spacecraft to continue monitoring the Polar Regions mainly for changes in the thickness of the polar ice sheets and floating sea ice. [March 2007. [Military Implications, Sources](#)]



## **United Nations Agreement to Protect the World's Forests Adopted**

Although not a legally binding document, the agreement on international forest policy and cooperation is an important instrument for sustainable forest management. By setting international standards for forest management, the agreement is expected to advance international cooperation on forest conservation, improve forest products trade, and develop national policies that would reduce deforestation, prevent forest degradation, and improve the living standard of all forest-dependent peoples. The agreement was adopted at the United Nations Forum on Forests, following 15 years of negotiations and debates on whether a treaty or an agreement is needed for improving the world's forests management. A voluntary global financing mechanism for forest management is supposed to be adopted by 2009. [May 2007. [Military Implications, Sources](#)]

## **Marine Environment**

### **Political Agreement Reached on the European Marine Strategy Directive**

The European Environment Council reached political agreement on the framework directive for EU action on marine environment policy. The Marine Strategy Directive aims to ensure that all EU marine waters are environmentally healthy by 2021 and it is the main component of the Thematic Strategy on the Protection and Conservation of the Marine Environment, which was adopted in October 2005. The Strategy is based on regional assessment of the marine situation, exchange of information, and design of policies to improve ecosystem conservation or rehabilitation, as well as pollution reduction and clean-up. [See also *New EU Environmental Strategies* in September 2005, *Europe to Harmonize Marine Pollution Legislation* in July 2005, *The European Union Environmental Initiatives* in January 2005, and *International Maritime Organization (IMO) wants global rather than many different local or regional rules* of January 2003 environmental security monthly reports.] [December 2006. [Military Implications, Sources](#)]

### **International Conference and Assessments Find Rising Ocean Pollution**

The Second Intergovernmental Review (IGR-2) meeting of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) attended by over 700 participants from some 115 countries was held in Beijing, October 16-20. The delegates assessed progress so far and the main issues concerning ocean pollution, and addressed the actions needed for the next period 2007-2011. Although no legally binding instruments were adopted, "soft law" timetables and measures offering more flexibility and adaptability to countries' and regions' specifics were discussed. New scientific estimates released at the meeting reveal that due to pollution, the number of marine 'dead zones' or low oxygenated areas may have reached 200, threatening fish stocks and the livelihood of people who depend on fisheries. And, an estimated 16% of the world's coral reefs suffered up to 90% mortality. UNEP new report, *The State of the Marine Environment: Trends and Processes*, is a comprehensive assessment of pollution evolution and trends, warning of critical areas and suggesting recommendations to improve control and reduce contamination caused mainly by discharge of untreated wastewater. The report also notes that the number of coastal dead zones has doubled every decade since 1960, and that coastal ecosystems will be further endangered by rising populations in those areas. Highly populated East Asia discharges 90% of its untreated sewage

into water. The Beijing Declaration on Furthering the Implementation of the GPA will be submitted for endorsement to the next UNEP Governing Council/Global Ministerial Environment Forum in February 2007. [October 2006. [Military Implications, Sources](#)]

### **Commercial Whaling Ban Strengthened by International Whaling Commission (IWC)**

Delegates to the IWC meeting adopted a resolution to keep the moratorium banning commercial whaling in effect, despite Japan's lobbying for its suspension. Conservation organizations and anti-whaling countries argue that Japan's lethal "scientific research on whales," violates international regulations for whales' protection. Japan threatens to leave the IWC and form another organization to deal with regulations on whale-related issues. [June 2007. [Military Implications, Sources](#)]

### **Roadmap for Establishing the Global System of Marine Protected Areas**

Establishing a Marine Protected Areas network by the year 2012 was proposed at the First International Marine Protected Areas Congress held in October 2005. Establishing Networks of Marine Protected Areas – Making It Happen is a roadmap for helping to meet that goal. Launched at the World Conservation Union (IUCN) Marine Protected Area Summit in Washington, DC, April 11, 2007, it was published by the National Oceanic and Atmospheric Administration, in collaboration with the IUCN World Commission on Protected Areas, the Great Barrier Reef Marine Park Authority, the World Wildlife Fund–Australia, and The Nature Conservancy. [See also *Network of Marine Protection Areas to be Adopted by 2012, Marine Environment Needs More Protection, Stronger Regulations to Protect Ocean Marine Environments.*] [April 2007. [Military Implications, Sources](#)]

### **New Marine Protected Areas Proposed**

New proposals aim to protect critical marine ecosystems and whale and dolphin habitats in several Mediterranean Sea areas and the Black Sea from excessive fishing, intense shipping traffic, and maritime pollution. The proposed areas include (see map in the Appendix): the entire Alborán Sea and Straits of Gibraltar; the Strait of Sicily; the Amvrakikos Gulf (NW Greece); two Black Sea areas; and seven other Mediterranean areas—5 in Greece, 2 in Italy. The proposals will be put forward to the 20-country parties Agreement on the Conservation of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) by its Scientific Committee at the Meeting of the Parties to be held in Croatia, in October. Meanwhile, the Spanish Navy has asked ships to slow to 15 knots and sail "in a maximum state of vigilance" to avoid colliding with whales in the Strait of Gibraltar. [Note: The state of World Fisheries and Aquaculture 2006 report released this month by FAO warns that several species of fish in high seas outside of national jurisdictions are in danger.]

The World Wildlife Fund (WWF) launched a campaign for creating a network of conservation areas in the Southern Ocean by 2012, to protect it against unsustainable fishing, marine pollution, and effects of climate change. WWF will put forward the Southern Ocean protection proposal at the next Antarctic Treaty Consultative meeting, to be held from 30 April to 11 May 2007 in New Delhi, India. [Note: see item Website for Marine Protected Areas and Cetaceans' Sanctuaries further in this report] [March 2007. [Military Implications, Sources](#)]

### **Malacca Straits Need Increased Protection from Various Security Threats**

The Malacca Strait, one of the most important shipping lanes in the world, faces many challenges, including piracy, terrorists' attacks and environmental degradation. If terrorists were to sink a ship at the shallowest part of the strait, no ship could pass through, and all traffic would be blocked. At the same time, increased traffic volumes add pressures to the ecosystem of the straits. In an address jointly hosted by the embassy of Malaysia and the Institute of Foreign Affairs and National Security, the Hon Dato' Sri Najib Tun Abdul Razak, Deputy Prime Minister of Malaysia, urged the need for united efforts by all users of the straits to address these challenges. [March 2007. [Military Implication, Source](#)]

### **Network of Marine Educators Formed to Protect Pacific**

According to Environmental News Network, the International Pacific Marine Educators Conference (IPMEC), held 15-18 January 2007, in Honolulu, "has resulted in the establishment of a Pacific network of marine educators designed to ensure the health of the Pacific and the communities that depend upon it. The network aims to facilitate real action in marine education and highlight the need for ocean stewardship across the Pacific." [February 2007. [Military Implications, Sources](#)]

### **Website for Marine Protected Areas and Cetaceans' Sanctuaries**

A new website, cetaceanhabitat.org, sponsored by the Whale and Dolphin Conservation Society, provides comprehensive information on the nearly 600 proposed and existing marine protected areas and sanctuaries for cetaceans. It has summaries and links to international treaties on MPAs; definitions of key MPA terms; updated news on proposals for new MPAs, and other related resources. [March 2007. [Military Implications, Sources](#)]

## **Heavy Metals**

### **Progress on Global Mercury Ban**

The negotiations for a global ban of mercury progressed at the GC-24/GMEF (see Item 2. UNEP Governing Council/Global Ministerial Forum Makes Progress on Global Environmental Governance). Although a legally binding treaty imposing clear targets on cutting mercury use worldwide was not adopted, it was agreed that over the next two years an ad hoc open-ended working group will study the options for enhanced voluntary measures and international legal instruments to phase out mercury use. The group will provide a progress report to GCSS-10/GMEF, and a final report to GC-25/GMEF, which will make a decision on the matter. [February 2007. [Military Implications, Sources](#)]

### **EU Seeking Global Mercury Ban**

Health and environmental NGOs launched on January 10, 2007, the campaign "Stay Healthy, Stop Mercury" calling on the EU to promote global control on mercury pollution. The EU is expected to raise the global mercury ban issue at next month's UN Global Ministerial Environment Forum to be held in Nairobi, Kenya, February 5-9. [January 2007. [Military Implications, Sources](#)]

## **Europe Proposes Ban on Mercury Exports**

The European Commission has proposed legislation to ban all European Union exports of mercury starting in 2011, and the European Parliament has drafted a measure that would forbid its use in non-electrical measuring devices, with the exception of barometers and antique instruments. [See also *Mercury Instruments May Be Banned in EU* in February 2006, *EU Sets 2011 Deadline to Ban Mercury Exports* in June 2005, and *Governments Call for Global Assessment and Control of Mercury Pollution* in February 2005 environmental security reports.] [November 2006. [Military Implications, Sources](#)]

## **IMPROVED COMPLIANCE WITH ENVIRONMENTAL REGULATIONS**

### **European Environmental Liability Directive Came Into Force**

The Environmental Liability Directive establishes a comprehensive framework on liability for damage to the environment, based on the “polluter pays” principle. It aims to ensure that the financial liability for environmental damage prevention or remediation falls on the polluters who caused it, rather than on the taxpayers. Operators are financially responsible for ensuring that they have preventive or remedial measures. When the environmental situation involves more than one member state, then they must cooperate on the necessary preventive or remedial actions. The Directive was adopted in April 2004 and member states were supposed to bring into force the appropriate laws and regulations by April 30, 2007. [See also *European Union Polluter Pays Law*] [April 2007. [Military Implications, Sources](#)]

### **Environmental Crime Could Become a Felony in the EU**

The EU Commission has proposed that environmental crimes such as pollution with hazardous substances, illegal dumping of waste, or performing environmentally "dangerous activity" be treated as criminal offenses with minimum levels of punishment that could reach prison sentences or fines for serious cases. By applying the “polluter pays” principle, European courts could also put offenders out of business or order them to clean up the environment. If the proposal is approved by the European Parliament and member governments, it will become law for all 27 member nations. This would be the first criminal law drafted by the Commission after a 2005 EU Court of Justice ruling that the Commission has the power to draft criminal laws and decide what constitutes a crime, notably in the area of the environment. Environmental groups welcomed the plan but said the list of punishable crimes should be expanded. [February 2007. [Military Implications, Sources](#)]

### **EU to Increase Environmental Regulations Enforcement**

The European Commission intends to increase the enforcement of environmental regulations by introducing criminal sanctions for serious environmental offences. In light of last month's Ivory Coast incident of toxic waste dumping, it aims to strengthen enforcement of the EU Waste Shipment Regulation and improve international cooperation to prevent illegal waste shipments. The issue will be addressed at the next Basel Convention conference to be held in Nairobi, November 27-December 1, 2006. [See also *Toxic Waste Disposal of Global Growing Concern* in

September 2006, as well as *Basel Convention on Hazardous Wastes to be Made More Effective* in July 2005 and other related items in previous environmental security scanning reports.] [October 2006. [Military Implications, Source](#)]

### **North America's Commission for Environmental Cooperation to Increase Enforcement of Environmental Regulations and Public Participation**

The Joint Public Advisory Committee (JPAC) of the Commission for Environmental Cooperation (CEC) of Canada, the United States, and Mexico held its third Regular Session for 2006 on 15 September in Montreal, Quebec, to discuss the proposed 2007-2009 Operational Plan. Participants assessed progress on cooperative projects the CEC is implementing to meet the goals and objectives of Looking to the Future: Strategic Plan of the Commission for Environmental Cooperation 2005–2010. The focus was on the implementation of the three program priorities as established by the CEC Council: information for decision-making; capacity building; and trade and environment, mutually reinforcing each other. Proposals called for increased comparability and reliability of environmental data and networks among the U.S., Canada, and Mexico; improved submission and enforcement procedures—to speed the process and increase citizen participation and responsibilities; and creating a North-American comprehensive atlas of all resources, ecosystems, and pollution matters. The Operational Plan will be updated annually, with a rolling three-year horizon, to reflect shifts in programming and associated budget reallocations. [September 2006. [Military Implications, Source](#)]

### **Biological Weapons Convention**

#### **Sixth Review Conference of the Biological Weapons Convention**

The three-week review Conference of the Biological Weapons Convention made some positive steps forward that included giving more power to the present temporary secretariat to oversee the treaty and monitor compliance, and holding, by 2011, four intersessional meetings on the treaty topics—enhancing national implementation, measures to improve biosecurity, scientific codes of conduct, peaceful scientific cooperation, and assistance to any country that does fall victim to biological weapons. One representative criticized the conference for not addressing future issues such as new nonlethal agents and nanotech-related methods for delivering biological agents. [See also PrepCom to Set Agenda for the BWC Review Conference in April 2006, Recommendation for a Biosecurity Watchdog in February 2006, and Time to Strengthen the 1972 Biological Weapons Convention in December 2004 environmental security reports.] [December 2006. [Military Implications, Source](#)]

### **Kyoto/Climate Change**

#### **Lawsuits over Failure to Meet Kyoto Commitments**

The Friends of the Earth threaten to sue the government of Canada over its refusal to adopt adequate policies to cut greenhouse-gas emissions and meet its commitments as agreed under the Kyoto Protocol. The environmental group will file the lawsuit with the Canadian federal court and the Kyoto Protocol Compliance Committee, unless the government changes its position. In



May, South Africa filed with the international Kyoto Committee a complaint against Canada and 14 other countries over failure to report on their progress, as required. [See also *Global Warming Goes to Court* in October 2006 environmental security report.] [November 2006. [Military Implications, Source](#)]

### **Global Warming Goes to Court**

The New Zealand High Court has ruled that climate change factors can be considered during Greenpeace's upcoming appeal against the proposed Marsden B coal-burning power station. Greenpeace appealed the permission granted to the Marsden B power station to start burning coal, on grounds of environmental and mainly climate change consequences. Although this ruling is limited to New Zealand and to a specific industry, it creates a precedent with effects likely to be felt in other jurisdictions and sectors. In November, the U.S. Supreme Court will hear the case of *Massachusetts v. Environmental Protection Agency* (case 05-1120) filed by twelve states and several cities on EPA's role to regulate CO<sub>2</sub> as a greenhouse gas pollutant under the Clean Air Act. Over 16 other litigations are pending in U.S. federal and state courts against companies whose emissions are linked to global warming; more are expected to come. Swiss Re, the world's largest reinsurance company, estimates that the annual liability costs of global warming will be \$150 billion dollars per year within ten years. [October 2006. [Military Implications, Sources](#)]

### **Global Division of Financial Responsibility for Global Warming Impacts**

Oxfam has called for a system to allocate costs of global warming damage per country based on its percentage of greenhouse contribution. Poorer countries are not included. They list the US with 44%, Japan with 13%, Germany 7%, and so forth. With China's increasing role, the percentages would be continually adjusted. China will release its first national plan to address climate change just prior to the G8 Meeting, which it will attend in Germany. [May 2007. [Military implications, Source](#)]

## **NEW STANDARDS WITH IMPLICATIONS FOR ENVIRONMENTAL SECURITY**

### **Green Standards to Counter E-waste**

In view of e-waste being the fastest growing category of waste, Greenpeace launched a new e-waste campaign on August 25th. In a preamble to the campaign, it compiled data on progress in eliminating hazardous chemicals and in recycling policies of the main mobile phone and PC-makers and ranked the companies based on their scores. The criteria used in the Greenpeace assessment are tougher than those stipulated by the European Restriction of Hazardous Substances (RoHS) directive, including polyvinyl chloride (PVC) and some brominated flame retardants (BFRs) on the restrictions list. Greenpeace also advocates the "precautionary principle", requesting companies to avoid chemicals with uncertain environmental impacts. [See also *RoHS Closer to Deadline* in May 2006, *Recycling Regulations in the EU* in August 2005 and *Two E-waste laws entered into force in the EU* in February 2003 environmental security reports.]

The Electronic Product Environmental Assessment Tool (EPEAT) produced by EPA also aims to encourage "green computers." After working for three years with major computer manufacturers,

EPA produced a "greener computers" list that consumers can consult to see what models are more environmentally friendly and why. The standards were developed by the Institute of Electrical and Electronics Engineers and consider 23 required criteria and 28 optional criteria in eight categories, including: content of environmentally sensitive materials (such as mercury, lead and cadmium); power requirements; lifespan; and the "end of life" recycling plans offered by the manufacturers. [August 2006. [Military Implications, Sources](#)]

### **ASTM Issues Standard Terminology for Nanotechnology**

The American Society for Testing Materials (ASTM) International Committee E56 on Nanotechnology has approved its first standard, E 2456, Terminology for Nanotechnology, under the jurisdiction of Subcommittee E56.01 on Terminology and Nomenclature. [December 2006. [Military Implications, Sources](#)]

## **SAFETY ISSUES**

### **Chemical and Biological safety issues**

#### **Toxicogenomics Risk Assessment**

The Use of Toxicogenomics to Understand Toxic Effects and Improve Risk Assessment workshop held by the U.S. National Research Council, Committee on Emerging Issues and Data on Environmental Contaminants, sought to identify how current toxicogenomic information can be used to inform risk assessment today and to identify toxicogenomic research directions to facilitate risk assessment in the future. Two chemicals of regulatory and scientific interest, dibutyl phthalate and benzene, were used as case studies to highlight the current use, controversies, and potential for using toxicogenomic information in risk assessment. [November 2006. [Military Implications, Source](#)]

#### **New Concerns Rising over Chemical Weapons**

The Organization for the Prohibition of Chemical Weapons (OPCW), the Chemical Weapons Convention's (CWC) secretariat, focuses on issues related to existing weapons, but specialists argue that new, modern chemicals and production plants could represent even higher risk. Jonathan Tucker of the German Institute for International and Security Affairs in Berlin remarks that a "new generation of small, flexible batch-processing chemical plants that can quickly be switched to producing any number of chemicals are not being inspected at all... and there are five times as many of them as there are declared dual-use plants." New molecules, such as the "novichok" nerve agents, or "incapacitants" such as fentanyl are overlooked, undermining the "international norm" and confidence in the CWC. [See also *Eleventh Chemical Weapons Convention, Five Countries Organize CWC National Authorities*, and other related items.] [April 2007. [Military Implications, Sources](#)]

#### **SIPRI Year Book 2007 Points out Environmental, Nuclear, and Energy Threats**

The 2007 edition of the authoritative Stockholm International Peace Research Institute (SIPRI) Yearbook, along with statistics on conflict and weapons expenditure, highlights the main



categories of threats to peace that the world faces. Among the main threats, it lists: energy, which “could become a weapon”; and the environment, highlighting that “Using the world’s resources to address hunger, environmental factors and poverty is likely both to improve human survival and to strengthen international security.” Concerning nuclear, chemical and biological threats, the report warns on high uncertainties of the stockpiles and research around the world and calls for increased transparency and better policies for risk assessments and risk-remediation strategies. [June 2007. [Military Implications, Sources](#)]

### **Scientific Community’s Questions Concerning Biodefense Standards**

The American Type Culture Collection (ATCC) convened an Expert Panel on the Development of Standards for Biodefense in Washington, DC, 5-6 April 2006. Considering the critical point reached in the evolution of the biodefense industry, the scientific community agreed that standards are needed to accelerate product development for biodefense-related diagnostics, therapeutics, and reagents. However, on debating the standards issue, a panel of experts generated a range of questions that still require resolution in several areas, including standard handling protocols—that would include protocols for handling, storage, transport, inactivation, and disposal of biomaterials. [See also *Better International Controls Needed to Prevent Bioterrorism* in July 2006, *Assessment and Recommendations for Biosecurity* in June 2006, and *Recommendation for a Biosecurity Watchdog* in February 2006 environmental security reports.] [August 2006. [Military Implications, Source](#)]

### ***Human Biomonitoring for Environmental Chemicals***

This is an independent study by the National Research Council (NRC) of the National Academies to address the challenges related to biomonitoring, including improving biomonitoring systems, interpreting the results of biomonitoring data to the public health, addressing ethical uses of the data, and communicating the results of biomonitoring to different forums. The report recommends improving the interpretation of biomonitoring results by expanding the scientific database on many chemicals; better coordination between biomarker development and population biomonitoring and the potential health implications; improved ability to assess the real health risks of detected chemicals; development of strategies for efficient communication of biomonitoring studies’ results; and a review of the bioethical issues concerning biomonitoring, including confidentiality and reporting. [November 2006. [Military Implications, Source](#)]

### **ETC Report Warns of the Threat of Synthetic Biology and Calls for Global Regulations**

An ETC Group report, *Extreme Genetic Engineering; An Introduction to Synthetic Biology*, covers five major areas of research in synthetic biology: making minimal microbes; assembly line DNA; building artificial cells from the bottom up; and pathway engineering and expanding earth’s genetic system. The report looks at implications for trade, a synthetic energy agenda, intellectual property, the politics of biodiversity, and it warns, “today’s synbio industry has made the work of bioweaponeers a whole lot easier.” It looks at ‘synthetic governance’ and gives some recommendations including the need for establishing an international body to monitor and assess societal impacts of emerging technologies—including synthetic biology—to facilitate coordinated global action, and the fact that “building blocks of life” shouldn’t be privatized. The

ETC Group presented the report and its recommendations at the World Social Forum held in Nairobi, Kenya, January 20-25.

Note: In September 2006, the European Commission 6th Framework Programme, NEST–New and Emerging Science and Technology published the report *Synbiology: An Analysis of Synthetic Biology Research in Europe and North America*, which is a synthesis of “1100 papers connected to the Synthetic Biology field in peer-reviewed journals published since 1990.” [January 2007. [Military Implications, Sources](#)]

### **Russia’s Floating Nuclear Plants Pose International Security Risk**

Russia has started building the world’s first floating nuclear power plant. A ship with two 35-megawatt reactors is expected to be operational in three years and supply electricity in remote areas in Russia as well as potential foreign markets. Despite warnings from environmentalists, Russia plans to build seven of these nuclear ships. [See also *Increasing Nuclear Safety and Security*] [April 2007. [Military Implications, Source](#)]

### **Proceedings of the Workshop Risk, Uncertainty and Decision Analysis for Environmental Security and Non-chemical Stressors**

The workshop “Risk, Uncertainty and Decision Analysis for Environmental Security and Non-chemical Stressors” was held April 26-29, 2007 in Lisbon, Portugal. The objective of the workshop was to explore how to improve risk assessment and modeling for non-chemical environmental stressors by adapting chemical risk assessment approaches and tools. The outcomes of the workshops were not available at the time of this writing. [April 2007. [Military Implications, Source](#)]

## **Pandemics**

### **Proposed Global Early Warning System for Monitoring Pandemics**

Scientists propose a global early warning system to monitor possible pandemic outbreaks. A recent study led by Nathan Wolfe, professor of epidemiology at the University of California, Los Angeles, revealed that the “emergence of the major diseases of humanity is not a random process.” Understanding the patterns between origins of major infectious diseases in temperate and tropical countries and individuals exposed to wild or domestic animals might help prevent eventual migration to humans, as well as forecast and avoid eventual pandemics. Delegates to the 59th World Health Assembly also stressed the importance of rapid, worldwide sharing of knowledge on diseases, since “in a globalized world, health issues have an impact on the collective security of people around the world.” [May 2007. [Military Implications, Sources](#)]

### **FAO Launched New Crisis Management Centre**

In collaboration with the World Organisation for Animal Health, the UN Food and Agriculture Organization launched a new Crisis Management Centre to fight avian influenza outbreaks and other major animal health or food health-related emergencies. The center continuously monitors disease information around the globe and is able to respond in less than 48 hours, when a suspected outbreak is reported. [October 2006, [Military Implications, Sources](#)]

## **WHO-sponsored pandemic flu task force holds first meeting in Geneva**

The Ad Hoc Influenza Pandemic Task Force held its first meeting to discuss best actions in case of an outbreak. The Task Force is providing independent risk assessments and advising WHO on possible measures to be taken. These could include rapid containment effort, warning governments of risks and accelerating vaccine production. The Task Force includes 21 experts and will function until June 15, 2007, when WHO's revised International Health Regulations come into effect. [October 2006, [Military Implications, Sources](#)]

## **Potential Health and Environmental Threats of Some New Technologies**

### **Nanotechnology**

#### Research Matters

[Grand Challenges for Nanotechnology](#)

[UK to Have New Nanotechnology Risk Information Service](#)

[Risks of Nanotechnology Applications](#)

[Berkeley, California, Considering Nanoparticle Health and Safety Law](#)

[Carbon Nanotubes May Spread in Water More Widely Than Thought](#)

[Scientists Correlate Nanoparticle Structure and Toxicity](#)

[Australian New Report and Research Group on Nanotechnology](#)

[Nanomaterials Handbook](#)

[Characterising the potential risks posed by engineered nanoparticles](#)

[Review of Safety Practices in the Nanotechnology Industry](#)

[Data Base for Nano Environmental Health and Safety](#)

[Major German Study on Nanotech in Food Industry](#)

[Nanotube Toxicity Tests Unreliable](#)

[Inhaled Nanoparticles May Have Easy Path to Brain](#)

[Cleanup and Other Nanomaterials May Re-release Pollutants](#)

[Increased Research Needed to Address Environmental, Health, and Security Issues Related to Nanotechnology](#)

[Nanotechnology and the Food and Agriculture Sector](#)

[Reaction to Voluntary Nanomaterial Reporting Scheme](#)

[FDA Forms Internal Nanotechnology Task Force](#)

[European Commission Opens Nano2Life Network](#)

[Chinese and Russian New Nanotechnology Organizations](#)

[UK Nanotechnology Policy Review Announced](#)

[Swiss Firm Offers Nanotech Risk Assessment Data and Safety Certification](#)

[UN Environment Programme Calls for Nanotech Safeguards](#)

[Survey Gives Insight into Effective Nanotech Education Methods](#)

French Research Council to Study Nanotube Toxicity  
European Guide to Green Masters Programs Launched  
Toxic Metals Carried into Cells by Nanoparticles

Reports Addressing Nanotechnology Safety

Conferences on Nanotechnology with Environmental Security Implications

#### Grand Challenges for Nanotechnology

A group led by Andrew Maynard of the Woodrow Wilson Center's Project for Emerging Nanotechnologies suggest five "grand challenges" for nanotechnology over the next 15 years:

- develop instruments to assess exposure to engineered nanomaterials in air and water within next 3-10 years
- create and test ways of evaluating the toxicity of nanomaterials in 5-15 years
- generate models to predict their possible impact on the environment and human health over the next 10 years
- develop ways to assess the health and environmental impact of nanomaterials over their entire lifetime, within the next five years
- organize programs to enable risk-focused research into nanomaterials, within the next 12 months

The leadership of the House of Representatives Science Committee commented, "This paper should be a landmark in the history of nanotechnology research. It lays out a clear, reasonable, prioritized, consensus-based set of priorities for examining the potential environmental and health consequences of nanotechnology over the next decade and a half." [November 2006.

[Military Implications, Sources](#)]

#### UK to Have New Nanotechnology Risk Information Service

The UK Department of Trade and Industry has announced that a new nanotechnology risk information service, Safenano.org, is due for launch in April 2007, and "will take the form of a web-based information service ... with a regular bulletin service and comprehensive database of relevant publications. Emerging scientific evidence concerning the potential risks of nanoparticles and nanotubes, together with information about Health and Safety, Occupational Hygiene, Toxicology and Risk Assessment will be interpreted and delivered to the audience in an integrated way, to support effective risk management." [November 2006. [Military Implications, Sources](#)]

#### Risks of Nanotechnology Applications

A recent article in Nanowerk pointed out the increasing use of nanomaterials in building construction, and the consequent rise in health and environmental risks because of this usage. [November 2006. [Military Implications, Sources](#)]

### Berkeley, California, Considering Nanoparticle Health and Safety Law

The city of Berkeley, California is proposing the world's first local regulation of nanomaterials. It would add a nanoparticles health and safety disclosure to a city law that already requires an inventory and safety plan from any business or other person handling large quantities of hazardous materials. Other localities have discussed such measures, but this is the furthest any has progressed. [November 2006. [Military Implications, Sources](#)]

### Carbon Nanotubes May Spread in Water More Widely Than Thought

A study by Jaehong Kim and colleagues at Georgia Institute of Technology has shown that carbon nanotubes, which are hydrophobic and clump together in water, may nevertheless interact with natural organic matter found in lakes and rivers, in ways that lead to their wider dispersion. [December 2006. [Military Implications, Source](#)]

### Scientists Correlate Nanoparticle Structure and Toxicity

Andre Nel and his team at UCLA's Johnson Cancer Center have been investigating the relationships between the structural characteristics of nanoparticles and their toxicity. According to Meridian Nanotechnology and Development News, this work "contributes to efforts to identify key factors or tests that can be used to predict toxicity, permit targeted screening, and allow materials scientists to generate new, safer nanoparticles with this structure-toxicity information in mind.... [They] found that ambient particles and positively charged polystyrene spheres generated high levels of reactive molecules, and induced oxidative stress in defense cells from the lung called macrophages. Little activity was observed for carbon black, titanium dioxide, and negatively charged polystyrene spheres." [October 2006. [Military Implications, Source](#)]

### Australian New Report and Research Group on Nanotechnology

Options for a National Nanotechnology Strategy, a report by an Australian federal government taskforce, outlines the establishment of a national nanotechnology office and a public awareness campaign on the potential social and ethical implications of nanotechnology. The report notes the insufficient information about the potential health risks of nanoparticles and calls for more research on toxicity and occupational and environmental risks. NanoSafe Australia is a new group of nanotechnology toxicologists formed for investigating risks associated to nanoparticles use and handling. [October 2006. [Military Implications, Source](#)]

### Nanomaterials Handbook

A new 780-page Nanomaterials Handbook has been published by CRC Press. With 27 chapters by 62 authors, this encyclopedic work thoroughly covers the field, and received a very favorable review in Nature. The only significant criticism was its lack of almost all 2005 and later work (a type of problem difficult to avoid in a very large compendium in a rapidly advancing field). [October 2006. [Military Implications, Sources](#)]

### Characterising the potential risks posed by engineered nanoparticles

Characterising the potential risks posed by engineered nanoparticles—UK Government research—a progress report by the UK Department for Environment, Food and Rural Affairs (DEFRA), covers the work of five Task Forces: Metrology, Characterisation, Standardisation and Reference Materials; Exposures – Sources, Pathways, and Technologies; Human Health Hazard and Risk Assessment; Environmental Hazard and Risk Assessment; and Social and Economic Dimensions of Nanotechnologies. According to the DEFRA announcement, the report includes details of the UK's action plans and assesses progress made towards meeting the 19 research objectives presented in the 2005 report. [October 2006. [Military Implications, Sources](#)]

### Review of Safety Practices in the Nanotechnology Industry

A Review of Safety Practices in the Nanotechnology Industry - Phase One Report: Current Knowledge and Practices Regarding Environmental Health and Safety in the Nanotechnology Workplace was prepared for the International Council on Nanotechnology by the University of California, Santa Barbara. According to the press release, the report “offers a review and analysis of existing efforts to develop 'best practices' ” but “finds that efforts to catalogue workplace practices have not systematically documented current environment, health and safety practices in a variety of workplace settings and geographies.” [October 2006. [Military Implications, Sources](#)]

### Data Base for Nano Environmental Health and Safety

The International Council on Nanotechnology (ICON), managed by Rice University's Center for Biological and Environmental Nanotechnology, has established the ICON Environmental, Health and Safety (EHS) database, containing summaries (abstracts) and citations for research papers related to the EHS implications of nanoscale materials. The database allows search by keywords and by aspects of the research reported, such as "exposure pathway = inhalation". [September 2006. [Military Implications, Sources](#)]

### Major German Study on Nanotech in Food Industry

The German Federal Institute for Risk Assessment (Bundesinstitut für Risikobewertung (BfR)) is undertaking a major assessment of the potential dangers of nanotechnology in the food industry. The study will involve 100 experts from research, industry, public agencies, consumer associations, and NGOs in a multi-phase interviewing and mutual commenting process. According to Food Production Daily, "the objective is to identify ... nanomaterials, assign them to concrete applications, and then draw conclusions on consumer exposure. ... The applications will then be classified according to the level of probable risk and risk reduction strategies developed." The project is expected to be finished by the end of the year. [September 2006. [Military Implications, Sources](#)]

### Nanotube Toxicity Tests Unreliable

Researchers from the Institute of Toxicology and Genetics at the Karlsruhe Research Center in Germany may have discovered why carbon nanotubes toxicity tests are not consistent. Their investigation revealed that a reaction between the nanotubes and two non-soluble toxicity test reagents, formazan and methylthiazol tetrazolium (MTT), was causing a "false positive"



outcome. Three other tests on the same nanomaterial had yielded negative results. [September 2006. [Military Implications, Sources](#)]

#### Inhaled Nanoparticles May Have Easy Path to Brain

Studies by scientists at the University of Rochester Medical Center found that nano-sized materials inhaled by rats had rapid and efficient pathways from the nasal cavity to several regions of the brain. They also caused changes in gene expression in the invaded regions. These are preliminary results, in an animal model, and have not shown actual cellular damage, but later proof of deleterious effects in higher models would have a strong effect on the regulation of airborne nanoparticles. [See also *Nanotechnology Health Concerns Highlight Need for International Technology Convention* in April 2004 and *Nanotech Health Dangers Increasingly Understood around the World* in January 2004 environmental security reports.] [September 2006. [Military Implications, Sources](#)]

#### Cleanup and Other Nanomaterials May Re-release Pollutants

Research by Prof. Baoshan Xing, of the Department of Plant, Soil & Insect Sciences at the University of Massachusetts has indicated that fullerenes and carbon nanotubes may exhibit reversible adsorption of polycyclic aromatic hydrocarbons, releasing into their environments toxic substances previously adsorbed by them. [September 2006. [Military Implications, Sources](#)]

#### Increased Research Needed to Address Environmental, Health, and Security Issues Related to Nanotechnology

The Environmental, Health, and Safety Research Needs for Engineered Nanoscale Materials report by the Nanoscale Science, Engineering, and Technology (NSET) Subcommittee of the U.S. National Science and Technology Council's Committee on Technology identifies environmental, health, and safety (EHS) research and information needs related to understanding and management of potential risks of engineered nanoscale materials.

*A Matter of Size: Triennial Review of the National Nanotechnology Initiative*, a new report from the National Research Council's Committee to Review the National Nanotechnology Initiative, although generally positive on the initiative's work in overseeing the U.S. government's role in developing nanotechnologies, suggests that improvements are needed mostly in the areas of measuring economic return, and addressing potential safety risks associated with nanomaterials. "The body of published research addressing the toxicological and environmental effects of engineered nanomaterials is still relatively small," states the report. Accepting the report's recommendations, in an interview with *The Scientist*, E. Clayton Teague, director of the federal National Nanotechnology Coordination Office, pointed out that the federal budget for environment, health, and safety research regarding nanotechnology will expand from \$38 million in 2005 to \$44 million in 2007, trying to fulfill the research needs suggested by the NSET report in addressing EHS issues related to nanotechnology. [September 2006. [Military Implications, Sources](#)]

#### Nanotechnology and the Food and Agriculture Sector

Nanotechnology in Agriculture and Food Production: Anticipated Applications, by Jennifer Kuzma and Peter VerHage from the University of Minnesota's Center for Science, Technology,



and Public Policy, discusses possible future nanotech-based food and agriculture applications, their potential benefits and risks, and requirements for environmental, health and safety oversight. Their investigation also resulted in creation of a searchable, online database covering more than 160 research projects. [September 2006. [Military Implications, Sources](#)]

#### Reaction to Voluntary Nanomaterial Reporting Scheme

According to Meridian Nanotech News, "The U.K. Department for Environment, Food, and Rural Affairs (Defra) has released a document summarizing and responding to the results of a consultation it published in March seeking opinions on a 'Voluntary Reporting Scheme' for [the properties of] engineered nanomaterials." The scheme met with general support, as did its underlying evidence-based approach for determining the need for risk controls. [September 2006. [Military Implications, Sources](#)]

#### FDA Forms Internal Nanotechnology Task Force

The US Food and Drug Administration has announced the formation of an internal Nanotechnology Task Force for determining regulatory approaches that encourage the continued development of innovative, safe and effective FDA-regulated products that use nanotechnology materials, and to identify and recommend ways to address any knowledge or policy gaps that exist, so as to better enable the agency to evaluate possible adverse health effects from FDA-regulated products that use nanotechnology materials. [August 2006. [Military Implications, Sources](#)]

#### European Commission Opens Nano2Life Network

According to an announcement from its coordinator, "Nano2Life (N2L) is the first European Network of Excellence in nanobiotechnology supported by the European Commission under the 6th Framework Programme. Its objective is to support ... [Europe's] position as a competitive player and to make it a leader in nanobiotechnology transfer by merging existing European expertise and knowledge in the field of Nanobiotechnology." It comprises 64 organizations and companies, with associate members from South Korea, Japan, Australia, and North America. One of the points in its Programme of Activity is founding the first European Ethical, Legal and Social Aspects Board (ELSA) in the field of Nanobiotechnology. This body will undoubtedly concern itself in a major way with questions of nanotechnology risk, the environment, and regulation. [August 2006. [Military Implications, Sources](#)]

#### Chinese and Russian New Nanotechnology Organizations

The Chinese Academy of Science's National Center for Nanoscience and Technology and Institute of High Energy Physics have opened a Laboratory for Biological Effects of Nanomaterials and Nanosafety in Beijing on the IHEP campus. Russia has opened the Pilot Scientific and Technical Center of Excellence for Nanotechnology Development in Moscow. [July 2006. [Military Implications, Sources](#)]

#### UK Nanotechnology Policy Review Announced

The UK government has asked the Council for Science and Technology to review national nanotechnology policy commitments and provide written evidence of their findings. This review is in part a follow-up to the 2004 Royal Society report, Nanoscience and nanotechnologies: opportunities and uncertainties. [July 2006. [Military Implications, Sources](#)]

### UK Review Faults Governments' Nanotech Risk Assessment Plans

The UK's Council for Science and Technology (CST) has released a review of the government's response to the recommendations on nanotech risk studies made in the Royal Society's 2004 report. The review states that the government's efforts to provide support for such research are progressing too slowly. It equally criticizes the US and other countries for similar failures. [April 2007. [Military Implications, Sources](#)]

### Nanomaterials' Biological Risks a Complex Problem

Two research projects at Rensselaer Polytechnic Institute, led by Asst. Prof. of Biomedical Engineering Deanna M. Thompson and Asst. Prof. of Earth and Environmental Sciences Anurag Sharma, have shown that the size, type, and dispersion of nanomaterials all may affect the materials' biological effects. Prof. Thompson's work dealt with the effect of nanotubes' degree of dispersion on their impact on cell growth, while Prof. Anurag's study was on long-duration effects on bacteria of nanotubes as compared with activated carbon or C60 fullerenes. [April 2007. [Military Implications, Sources](#)]

### Online Consultation on Nanomaterials Specification in EU Technical Guidance for Chemicals

According to an announcement from the EU, "The [European] Commission has ... launched a public consultation of the preliminary opinion of the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) on the appropriateness of the EU Technical Guidance Documents for chemicals in regard to nanomaterials. The online consultation, which will run until 23 May 2007, aims to gather feedback on proposed modifications to the Technical Guidance Documents and on needs for further research and development." The report notes that "... special characteristics of nanomaterials - potentially differing considerably from the conventional chemicals - have to be appropriately characterised. Furthermore, their toxicological behaviour and effects on health and the environment need to be assessed properly." Further, "The SCENIHR identifies issues requiring improvements in the technical guidance and methodologies, and proposes a staged strategy for the risk assessment of nanomaterials." [April 2007. [Military Implications, Sources](#)]

### Swiss Firm Offers Nanotech Risk Assessment Data and Safety Certification

According to an article from [www.in-pharmatechnologist.com](http://www.in-pharmatechnologist.com), the Swiss firm The Innovation Society "has developed the Cenarios system (Certifiable Nanospecific Risk management and Monitoring System) ... to collate risk related information from scientific, regulatory, technological and market sources and to generate a database of material to be applied to specific products and processes using nanotechnology." The system includes capabilities for managing risk assessment, and a continually updated database of current scientific and technical results. [March 2007. [Military Implications, Sources](#)]

### UN Environment Programme Calls for Nanotech Safeguards

UNEP's annual report on the global environment, GEO 2007, dedicates a whole chapter, Emerging Challenges – New Findings, to nanotechnology implications for the environment,

looking at 'The environmental benefits of nanotechnology', 'The environmental risks of nanotechnology', and future developments. The report notes that "swift action" is needed to adjust the legislative processes to properly address the challenges presented by nanotechnology, with priority given to assessing the potential risks of nanomaterials already being mass-produced, and calls for global test protocols and greater cooperation between private- and public-sector industries and between the developing and industrialized worlds. [February 2007. [Military Implications, Sources](#)]

#### Survey Gives Insight into Effective Nanotech Education Methods

A new survey report from the University of Wisconsin-Madison Materials Research Science and Engineering Center (MRSEC) Interdisciplinary Education Group suggests improved ways of educating audiences on the nature of nanotech, and its problems and possibilities. [February 2007. [Military Implications, Sources](#)]

#### New Report on Nanotechnology Applications in Water Treatment

Nanotechnology-based techniques are highly successful in removing both organic and inorganic contaminants from water. The consulting firm of Frost & Sullivan has issued a new report, Impact of Nanotechnology in Water and Wastewater Treatment, which outlines key nanotech water treatment applications and analyzes market and industry factors. It also provides a directory of contact information. [February 2007. [Military Implications, Sources](#)]

#### French Research Council to Study Nanotube Toxicity

The French National Research Council (CNRS) is beginning a three-year project to study the "eco-toxicity" of carbon nanotubes, as part of a National Research Agency project. The project will investigate three main aspects: the polluting effects of nanotubes in the environment; toxicity in humans; and how to produce nanotubes using cleaner methods. [February 2007. [Military Implications, Sources](#)]

#### European Guide to Green Masters Programs Launched

The Institute of Nanotechnology has announced the official launch of the European Nanotechnology Masters Recognition Scheme, for 10:30 a.m., 20 June 2007, at the Congress Center, Düsseldorf, as part of EuroNanoforum 2007, The Scheme site, which can be visited at <http://www.nano.org.uk/nanomasters/>, offers online access to descriptions of nanotechnology-related master's degree programs throughout Europe. [May 2007. [Military Implications, Source](#)]

#### Toxic Metals Carried into Cells by Nanoparticles

Scientists at the Swiss Federal Institute of Technology (ETH) Zurich and the Swiss Federal Laboratories for Materials Testing have discovered that metal oxide nanoparticles had up to 8 times the toxicity of the same metals in salt forms when brought into contact with lung epithelial cells. The explanation by one researcher is that "cell membranes provide a selective barrier against ions, preventing the dissolved metal salts from entering. Once a metal-containing nanoparticle has penetrated a cell, however, metal ions can leach from the particle and generate

ROS [reactive oxygen species] in the cell interior". The degree of the toxicity is related to the specific metal being introduced. [May 2007. [Military Implications, Source](#)]

### **Reports Addressing Nanotechnology Safety**

Assessing exposure to airborne nanomaterials: Current abilities and future requirements. [April 2007. [Military Implications, Source](#)]

New Nanotoxicology Journal Features Article on Airborne Nanomaterials  
Informa Healthcare has started publication of a new quarterly journal, Nanotoxicology, in both online and print versions. Information about it can be found at <http://www.informaworld.com/smpp/title~content=t716100760>

The inaugural issue features a 16-page article, "Assessing Exposure to Airborne Nanomaterials: Current Abilities and Future Requirements," written by Andrew Maynard, chief science advisor at the Wilson Center's Project on Emerging Nanotechnologies, and Robert Aitken, director of strategic consulting at the Institute of Occupational Medicine (Edinburgh, UK) [April 2007. [Military Implications, Source](#)]

The Institute for Food and Agricultural Standards (IFAS) at Michigan State University has released a 32-page report, *An Issues Landscape for Nanotechnology Standards: Report of a Workshop*. According to the announcement, "The report discusses critical issues surrounding five standards themes affecting ...nanotechnologies ... (1) timing and standards-setting, (2) product vs. process standards, (3) international harmonization, (4) integration of operational standards, and (5) participation and transparency." [April 2007. [Military Implications, Source](#)]

Nanotech Products Meeting to Be Held in London, 16-17 May—updated information is now available at [www.nano.org.uk/events/ionevents.htm](http://www.nano.org.uk/events/ionevents.htm) The meeting examined nanotechnologies that are described as "offering real environmental benefit, and will also review the findings of the recently published STOA report on the Role of Nanotechnology in Chemical Substitution." [April 2007. [Military Implications, Source](#)]

The International Council on Nanotechnology and the University of California at Santa Barbara have issued a new report, *A Review of Current Practices in the Nanotechnology Industry*, the second in a series. [See *Review of Safety Practices in the Nanotechnology Industry*]. According to the announcement, it is "the first comprehensive, international survey of workplace safety practices in the nanotechnology industry" and "documents results from survey data collected from 64 organizations in North America, the European Union, Asia and Australia." The release also says it, "...finds that many nanotech companies and laboratories believe nanoparticles ... may pose specific environmental and health risks for workers. In response, companies are reporting that they are developing special programs and procedures for mitigating risks to workers and consumers. Yet, due in part to a lack of general information regarding nanomaterials risks, companies and labs have workers using conventional environmental, health and safety (EHS) practices when handling nanomaterials, even though the practices were developed to deal with bulk materials that can have markedly different chemical properties than their nano-sized counterparts." The Director of ICON says "The use of conventional practices for handling

nanomaterials appears to stem from a lack of information on the toxicological properties of nanomaterials, as well as nascent regulatory guidance regarding the proper environmental, health and safety practices that should be used with them." [November 2006. [Military Implications, Source](#)]

*RCRA Regulation of Wastes from the Production, Use, and Disposal of Nanomaterials*, by the American Bar Association's Section of Environment, Energy, and Resources, discusses a number of issues related to the EPA's regulation of nanomaterial wastes under the Resources Conservation and Recovery Act (RCRA). Topics include the possible need for new definitions of hazardous nanomaterial characteristics, injunctive relief against imminent and significant risks, and the current practice of relying on the waste generator's process knowledge. [August 2006. [Military Implications, Source](#)]

The Nano Science and Technology Institute (NSTI) has published the Proceedings of its 2006 Conference. Vol. 1, Chapter 6 of that work is entitled Environmental, Health and Societal Impacts of Nanotechnology, and includes a paper, *A Framework for Responsible Nanotechnology Standards*, describing a joint effort of Environmental Defense and DuPont. The Proceedings are available in print, or in a 2677-pp. CD-ROM. [August 2006. [Military Implications, Source](#)]

The new report by Woodrow Wilson International Center's Project on Emerging Nanotechnologies, *Nanotechnology: A Research Strategy for Addressing Risk*, makes several recommendations for nanotechnology risk assessment, including that the government: institute a top-down strategic framework for risk-based nanotechnology research, prioritize research, establish joint industry funding, and coordinate research activities internationally. [August 2006. [Military Implications, Source](#)]

The final report of Defra (UK organization), *Environmental Regulatory Gaps Study on Nanotechnologies*, addresses environmental regulation gaps concerning potential risks posed by products and applications of nanotechnologies, and it identifies measures that can be put in place to ensure adequate protection for human health and the environment. It is a comprehensive overview, analyzing each sector concerning nanotech—from substances, production and application, to environmental impacts—with respect to existing regulations, and highlighting the eventual gaps. [August 2006. [Military Implications, Source](#)]

The International Risk Governance Council ([www.irgc.org](http://www.irgc.org)) has issued a white paper, *Nanotechnology Risk Governance*, which uses the IRGC's risk governance framework, published in 2005, to analyze and identify current deficits in nanotechnology risk governance, separately considering current and future developments. It then offers initial recommendations for how decision makers may choose to deal with these risk governance gaps. These recommendations will be subject to further work, including discussions with appropriate stakeholders. [July 2006. [Military Implications, Source](#)]

The UNESCO World Commission on the Ethics of Scientific Knowledge and Technology has published a 25-page report, *The Ethics and Politics of Nanotechnology*. The work discusses "Nanotechnology Research Now" and "Ethical, legal, and political implications of nanotech", and it concludes with a list of the most recent reports that have been released covering nanotechnology, its implications, and the social, political and ethical issues surrounding it. [July 2006. [Military Implications, Source](#)]



The European Commission Scientific Committee on Emerging and Newly Identified Health Risks has issued a 79-page "modified opinion" on the appropriateness of existing methodologies to assess the potential risks associated with engineered and adventitious products of nanotechnologies. This report discusses in detail the scientific rationale, including risk assessment methodologies and prioritization of needs in knowledge, and concludes with Committee and minority opinions, and references. [July 2006. [Military Implications, Source](#)]

CDC's National Institute for Occupational Safety and Health (NIOSH) has announced the release of a new progress report, Progress Toward Safe Nanotechnology in the Workplace, which, according to the release, details the advancements made by NIOSH in advancing scientific knowledge in understanding the occupational safety and health implications of engineered nanoparticles, and also suggests potential areas where future research could further expand this knowledge. [March 2007. [Military Implications, Source](#)]

#### National Nanotech Initiative Issues Risk Assessment Report

The US National Nanotechnology Initiative has issued a report, Understanding Risk Assessment of Nanotechnology, which manages in eight pages to offer a comprehensive, technically oriented introduction to nanotech risk assessment. The document contains 44 endnotes, listing hundreds of Web sites and paper citations. [March 2007. [Military Implications, Source](#)]

#### EPA Publishes White Paper on Nanotechnology

The US Environmental Protection Agency has issued a Nanotechnology White Paper. The 132-page document describes nanotech and its benefits and risks, and discusses risks assessment issues and research needs and priorities. An appendix contains a description of EPA's framework for nanotechnology research. [March 2007. [Military Implications, Source](#)]

The International Council on Nanotechnology (ICON) and Rice University's Center for Biological and Environmental Nanotechnology (CBEN) have been maintaining an online database of references to current work in nanotech environmental health and safety issues. They have now announced the launch of a new monthly online review journal, The Virtual Journal of Nanotechnology Environment, Health & Safety (VJ-Nano EHS). The new publication will contain primarily items added to the database during the current month, so that users can easily keep up with progress in the field. The site will also provide a series of occasional papers, access to the whole database, and a capability for search by a number of different aspects of the work reported, such as risk exposure group, particle type, and exposure pathway. The journal may be accessed at <http://icon.rice.edu/virtualjournal.cfm>. [March 2007. [Military Implications, Source](#)]

*Green Nanotechnology: It's Easier Than You Think*, from the Project on Emerging Nanotechnologies of the Woodrow Wilson International Center, discusses links between nanotechnology and environmentally friendly development and production. It also presents recommendations for proactive federal policy measures to encourage such applications of nanotech. [May 2007. [Military Implications, Source](#)]

### **Conferences on Nanotechnology with Environmental Security Implications**

The U.S. National Nanotechnology Coordination Office (NNCO) will hold a public meeting on January 4, 2007, to address the needs and priorities of environmental, health, and safety (EHS) research on engineered nanoscale materials. According to the announcement, the purpose of the meeting is to lay-out "strategic and interim goals for filling the EHS information needs gaps for nanomaterials." It will be structured around the following research areas: instrumentation, metrology, and analytical methods; nanomaterials and human health; nanomaterials and the environment; health and environmental surveillance; and risk management methods. [December 2006. [Military Implications, Sources](#)]

A conference, Nanotechnology - Products and Processes for Environmental Benefit, is to be held in London on 16-17 May 2007 under the auspices of the Royal Society. More information will be available shortly. [December 2006. [Military Implications, Sources](#)]

The 'Nanotechnologies - Safety for Success' conference, held 14-15 September in Espoo, Finland, has published its final report. The conference was attended by 180 specialists from 20 countries. According to the announcement, speakers introduced the audience to the opportunities, unknowns, and potential risks of evolving nanotechnologies, facilitated dynamic stakeholder discussion and identification of coordinated and concerted actions, and identified the key actions for efficient and well coordinated policies on nanotechnologies in Member States, in the European Union and internationally. [December 2006. [Military Implications, Sources](#)]

'Nanotechnology for Security and Crime Prevention' 18 January 2007, The Royal Society, London, will examine a wide spectrum of new scientific developments taking place in the fight against crime, from anti-terrorism laser technology with the potential to revolutionize airport security to the latest research discoveries in nanoforensics. [November 2006. [Military Implications, Sources](#)]

"Health & Environmental Summit on Nano" will be held during Nanotech 2007, May 20-24, 2007 in Santa Clara, California, convened by the Nano Science and Technology Institute (NSTI) in collaboration with the U.S. Food and Drug Administration, to assist with the FDA's fact-finding programs for Nanotechnology in Consumer Goods, including drugs, biologics, food and cosmetics. [November 2006. [Military Implications, Sources](#)]

The 4th NanoSpain Workshop will be held in Seville, 12-15 March 2007, bringing together several hundred participants to discuss the latest developments in nanotechnology. [November 2006. [Military Implications, Sources](#)]

#### EU Conference on Nanotechnology Safety Policies

The current Finnish Presidency of the EU held a conference, Nanotechnologies - Safety for Success, in Otaniemi, Finland on 14-15 September 2006, with the goal of facilitating a dialogue on the opportunities and concerns presented by nanotechnologies. Another objective was the development of specific safety recommendations for the application of nanotechnologies. The conference was attended by 180 experts from 20 countries. The presentations, covering the key actions for efficient and well-coordinated policies, are available on the conference's Web site.

International Nanotech Conference to be Held in Egypt, March 2007



An international conference, NanoTech Insight 2007 will be held in Luxor, Egypt, 10-17 March 2007, to discuss the latest trends and discoveries in nanoscience. Topics will include scientific and technical developments, applications, and ethical and environmental impacts. [October 2006. [Military Implications, Sources](#)]

#### OECD Meeting on Manufactured Nanomaterials

The OECD will hold a meeting of the recently established Working Party on Manufactured Nanomaterials in London on 26-27 October 2006 to finalize recommendations for the 2006-2008 Programme of Work regarding human health and environmental safety aspects of manufactured nanomaterials in the chemical sector, to be forwarded to the Chemicals Committee of OECD. The meeting will discuss reports on recent developments in nanotechnologies and nanomaterials, their safety, and related activities in other International Organizations. For example, there will be discussions of taking over the Woodrow Wilson Center's database and cooperating with other databases, such as the International Council for Nanotechnology (ICON)'s. [September 2006. [Military Implications, Sources](#)]

### **Growing Health Concerns over Electromagnetic Fields Might Trigger New Regulations**

#### [Warnings on Possible Wi-Fi Dangers](#)

#### [Potential Magnetic Fields Regulations in Japan](#)

#### Warnings on Possible Wi-Fi Dangers

The expansion of wireless connections and use increases experts' concerns and warnings on possible health effects of electronic smog. Recent research suggesting that use of mobile phones might increase brain tumor occurrence worsens concerns about the possible impact of the spreading Wi-Fi networks that expose people to electronic waves involuntarily. The spread of wireless connections might be dangerous mostly to the health of children and to the additional ~3% of population that the World Health Organization estimates are "electrosensitive." Sir William Stewart—chairman of the UK Health Protection Agency and former chief scientific adviser to the UK Government—along with some European governments, school boards and parents, scientists, and doctors are calling for an official investigation of the risks that electronic waves might pose to human health and the environment. [See also *Conviction in Transborder Electromagnetic Pollution Case, Study Says Mobile Phones Raise Tumor Risk*, and *Cell Phones Damage Rat Brains*] [April 2007. Military [Implications, Sources](#)]

#### Potential Magnetic Fields Regulations in Japan

The Japanese Ministry of Economy, Trade and Industry plans to introduce regulations concerning magnetic fields around power-transmission cables and other electric facilities. Although the country has regulations on electric fields, per se, magnetic fields are not subject to any standards. A working group will be created in June under the Subcommittee on Electric Power Safety to conduct investigations on the link between electromagnetic fields and human health problems, and to advise the ministry. The initiative seems to be partly triggered by a study to be released soon by the World Health Organization on environmental health standards

regarding electromagnetic fields. Along the same lines, the UK is finalizing a report that assumes a link between power lines and cancer, and that therefore recommends regulations for building around high-voltage power cables because of possible health risks. [April 2007. [Military Implications, Sources](#)]

## Sonar

### [The Debate over Use of Sonar by the Navy Continues; Legal Settlement Approved U.S. to Study Sonar Impact on Marine Mammals](#)

#### The Debate over Use of Sonar by the Navy Continues; Legal Settlement Approved

After a temporary restraining order issued July 3, blocking the use of high-intensity, mid-frequency sonar by the U.S. Navy during international Rim of the Pacific (RIMPAC) war games taking place in waters around Hawaii, on July 7, the judge has approved a settlement between the Navy and conservation groups, permitting the use of mid-frequency sonar during the eight-nation military exercises. The settlement agreement requires new safeguards, including a buffer zone, increased monitoring for marine mammals through underwater detection and aerial surveillance for marine mammals during sonar drills and the reporting of sightings to a marine mammal response officer. This type of sonar has been associated with mass strandings and deaths of whales, dolphins, and other marine species in U.S. waters and around the world. The conservation groups that filed the lawsuit were: Natural Resources Defense Council, the International Fund for Animal Welfare, the Cetacean Society International, the Ocean Futures Society (OFS), and (OFS) founder and director Jean-Michel Cousteau. [See also *Underwater Sounds from Human Sources Endangering Marine Life* in November 2005, *Coalition Urges UN to Consider Legislation to Curb Harmful Ocean Sounds* in June 2005, and other previous environmental security reports on the same issue.] [July 2006. [Military Implications, Sources](#)]

#### U.S. to Study Sonar Impact on Marine Mammals

The U.S. government approved a budget to research the effects of military sonar systems on whales and dolphins. Several scientists and environmental groups claim that underwater sonar to detect submarines interferes with the ecolocation system of whales and dolphins, sometimes causing mass strandings. The research will be conducted in Hawaii and will include studying the effects of military sonar systems on marine mammal hearing, as well as the development of electronic systems to detect the presence of marine mammals in naval training areas. The Hawaii research will provide an independent scientific view and reliable data on the effects of sonars on marine mammals and hopefully will elucidate the concerns. [See also *The Debate over Use of Sonar by the Navy Continues; Legal Settlement Approved*, *Underwater Sounds from Human Sources Endangering Marine Life*] [May 2007. [Military Implications, Sources](#)]

## POLLUTION ISSUES

### **World Health Organization: Stress Environmental Impact on Human Health**

The World Health Organization published a report showing correlation between disease and environmental factors for the first time at country levels. The analysis reveals that reducing environmental risks including pollution, unsafe water, ultraviolet radiation, and climate change could save 13 million lives per year. WHO estimates that in some countries, more than one third of the disease burden could be prevented through environmental improvements. Each country profile provide an overview of the health risks caused by the specific environmental situation of the country, thus helping policy making in setting priorities for disease prevention. [June 2007. [Military Implications, Sources](#)]

### **New Predictions for the Atmosphere by 2030**

Research funded by the EU network ACCENT assessed the state of the global atmospheric environment and evaluated the likely changes by 2030 in conjunction with current regulations. It presents three scenarios: Current Legislation Scenario—based on current air quality legislation; the Maximum technically Feasible Reduction scenario—based on implementation of technological breakthroughs to achieve maximum emissions reduction; and the Intergovernmental Panel on Climate Change (SRES-A2) scenario--- a relatively pessimistic approach is shown in contrast to the two more optimistic scenarios. The results suggest that current international legislation on air pollutant emissions is not adequate to reduce ozone and ecosystem damage (mainly caused by elevated nitrogen pollution.) [October 2006. [Military Implications, Source](#)]

### **China's ASAT Test Created Serious Long-Range Low-Earth Orbital Pollution**

The January 11, 2007 Chinese anti-satellite (ASAT) test created tens of thousands of new pieces of space debris in low-earth orbit (LEO) with size greater than 1 cm—large enough to cause significant damage to a satellite they might hit. So far about 900 pieces greater than 5-10 cm have been cataloged as being created by the Chinese test. Even without the Chinese test, a NASA model shows that some heavily used parts of LEO already have such a high density of debris that collisions of objects at these altitudes will increase the number of debris fragments by 200% in two hundred years. The January additions make this situation worse, and multiple future tests or uses of such ASATs—especially against much larger satellites—could greatly increase the threat to satellites, the Space Station, space shuttles and other space craft as they travel through this polluted space. At high altitudes, where the atmosphere is very thin, this debris can stay in orbit for centuries, and so far there is no effective way to remove it. This is likely to steadily increase space insurance costs and without major changes could eventually seriously limit access to space. This shows that one actor can affect future access to space for all. Currently 41 nations own satellites. Since there is no mechanism to address this pollution event, some kind of anti-ASAT debris creating treaty seems inevitable, possibly drafted by the Inter-Agency Space Debris Coordination Committee in Vienna. [February 2007. [Military implications, Sources](#)]

### **Polluted Skies and Global Warming Puzzle Decoded**

A team of U.S. and Israeli scientists seem to have found the link between global warming and cloud formation. The pattern they identified shows that light-reflecting pollution favors cloud formation, while light-absorbing aerosols impede it by warming the air, which impedes moisture

condensation. This finding helps better understand and predict climate change, as well as the role of different kinds of pollution in cloud formation and rain activity. [July 2006. [Military Implications, Sources](#)]

### **European New Web-based Air Pollution Monitoring System**

Users of the new Ozone Web released by the European Environment Agency can monitor and track ground level ozone across Europe. The Web site-based database is updated on an hourly basis with data from more than 500 air quality monitoring stations. Users can access the information on air quality in any part of Europe either by entering a place name or by clicking on a map of Europe. The Web site will also include information on the health implications of the respective ozone values. [July 2006. [Military Implications, Sources](#)]

### **Ozone Hole Worst Ever Recorded**

In addition to pollution, climate change is increasingly recognized as a cause for upper atmosphere ozone depletion. A new UN report revealing continuous ozone depletion, notes that this year's Antarctic ozone hole covered 29.5 million square kilometers and the ozone mass deficit was 40 million tonnes (European space Agency, ESA, measurements on October 2), the largest ever recorded. The assessment is based on a compilation of data provided by NASA and the ESA, and observations by the WMO Global Atmosphere Watch (GAW) ozone network. Scientists warn that the trend might continue for the next two decades unless measures are taken to curb climate change and diminish levels of ozone destroying substances in the atmosphere, and countries generally adhere to and enforce the Montreal Protocol and Vienna Convention on phasing out of ozone-destroying chemicals. At a Montreal Protocol meeting, held in New Delhi, October 28-November 3, UNEP will be presenting a 10-year road map for governments to follow in protecting the ozone layer. [October 2006. [Military Implications, Sources](#)]

### **Mission to Study Arctic Environmental Changes**

The UN launched a two-year scientific mission in the Arctic to monitor changes in global climate, thinning of the ozone layer, and impacts of chemical pollution. There is evidence that the Arctic climate is warming rapidly and that more serious changes are looming, which, although with global effect, would most drastically affect indigenous communities and polar biodiversity. [July 2006. [Military Implications, Sources](#)]

### **Burning Fossil Fuels Acidifies Oceans, Erodes Coral Reefs**

Impacts of Ocean Acidification on Coral Reefs and Other Marine Calcifiers, a report co-authored by scientists from Australia, Canada, France, Germany, Japan, Monaco, New Caledonia, and the United States, is a comprehensive analysis of marine calcifiers, documenting that worldwide emissions of carbon dioxide from fossil fuel burning is making the oceans more acidic, dramatically altering ocean chemistry and threatening marine biodiversity, mainly causing coral decalcification. Although recommending further research for determining the extent of the impacts, it predicts that calcification rates might decrease as much as 60% within the 21st century. [July 2006. [Military Implications](#)]

## **New Research Finds Human Energy Usage is a Long-Term Heating Problem Independent of Greenhouse Gases and Solar Radiation**

In addition to greenhouse gases and rises in solar radiation, the planet could continue to be warmed by the increasing number of people who are using ever larger amounts of energy that add heat from their use (combustion engines, nuclear reactors, etc.). In a briefing by Professor Eric Chaisson of Tufts University to the Foundation for the Future this month [March 2007], he demonstrated that human energy use will continue to warm the planet: 1) If global non-renewable energy use continues increasing at its current rate of ~2% annually and nothing else changes, then a 3 degree Celsius rise will occur in ~8 doubling times, or ~280 years (or ~350 years for a 10 degree Celsius rise); and 2) More realistically, if world population plateaus at 10 billion inhabitants by 2100, developed (OECD) countries increase non-renewable energy use at 1% annually, and developing (non-OECD) countries do so at ~5% annually until east-west energy equity is achieved in mid-22nd century after which they too continue generating more energy at 1% annually, then a 3 degree Celsius rise will occur in ~300 years, or 10 degrees Celsius in ~450 years. Hence, it is necessary to find energy sources, such as geothermal, tidal, wind, and photovoltaics that, unlike fossil or nuclear sources, do not add heat as they convert energy for human usage. [March 2007. [Military implications, Source](#)]

## **Accelerating Environmental Health Crises in China**

Tens of millions in southwest China suffer because of coal plants. The Yellow River, a water source for 140 million people, is drying up, due to agricultural and industrial demands, falling water tables, and changes in glacial and snow-cap melting patterns. On November 20, Beijing's air quality was rated as 'hazardous' and residents were warned to stay indoors. While per capita emissions remain low compared to developed nations, the growing impact of China on climate change, along with severe intra-country air pollution, is of increasing concern to environmentalists and policy makers. The World Energy Outlook 2006 reports that China will surpass the U.S. in 2009 as the biggest emitter of carbon dioxide. This is nearly a decade ahead of previous predictions. [See also *China Creates 11 Independent Environmental "Watchdog" Centers* in July 2006, *China's President Hu Ordered Environmental Regulations for Military Activities* in April 2006, and other related items in previous environmental security reports.] [November 2006. [Military Implications, Sources](#)]

## **CLIMATE CHANGE**

### **New Scientific Evidences**

The United Nations Intergovernmental Panel on Climate Change 4th Assessment Report, *Climate Change 2007: The Physical Science Basis*, intensified the debate and worries about global warming and is likely to increase response efforts. The report assesses the global situation as a whole (changes in the Earth's climate including atmospheric composition, global average temperatures, melting glaciers, rising sea levels, ocean conditions, and other climate changes) and presents global and regional future climate projections. It states with "very high confidence" that global warming is being caused by human activity and that "carbon dioxide emissions will continue to contribute to warming and sea level rise for more than a millennium, due to the

timescales required for removal of this gas from the atmosphere.” It presents a grim picture of the future — rising sea levels, more intense storms, extensive drought, and spread of some diseases. “We must, without further ado, agree on the definition of an institutional framework that will enable us to take more effective and efficient collective action,” said UN General Assembly President Sheikha Haya Rashed Al Khalifa. “Momentum for action is building; this new report should spur policymakers to get off the fence and put strong and effective policies in place to tackle greenhouse gas emissions,” said Achim Steiner, Executive Director of the United Nations Environment Programme. [February 2007, [Military Implications, Sources](#)]

### Global Warming and Extreme Weather Conditions

According to the Office of Maritime Transportation and Hydrography in Hamburg, the North Sea was 2.4°C warmer in October 2006 than the 1968-1993 average; and, since 1988 is in its strongest heating period since the start of recording (1873). Another German institute of research, WGBU, notes that everywhere seas and oceans are transformed by the climatic change: the surface water is heated, the sea level rises, the oceans become more acid, the storms are stronger. [November 2006. [Military Implications, Sources](#)]

Preliminary findings by the World Meteorological Organization (WMO) show that 2006 might be the sixth warmest year on record, with the average temperature estimated to be 0.42°C above the 1961-1990 annual average. It notes heat waves and prolonged drought in some regions, heavy rainfall, storms, and flooding in others, and the continuously decreasing Arctic sea ice. Along the same lines, analysts note that in Europe, this fall, continental temperatures were 1.8°C higher than the long-term average, and the past ten autumns have been the warmest on record. Also in Australia, this year the weather has been exceptionally warm and rainfall in many regions has been at near record lows. Drying has increased significantly in Africa in the past three years, reveals Gravity Recovery and Climate Experiment satellite data. [December 2006, [Military Implications, Sources](#)]

The Chinese Ministry of Science and Technology warns that global climate change will increase "extreme weather events", threatening China's food production. (A comprehensive government assessment is likely to be released in the first half of 2007.) Central India's extreme rainstorms rose in number and strength over the past fifty years, most probably due to global warming [December 2006, [Military Implications, Sources](#)]

With extreme heat waves in Europe and the hottest summer in North America, scientists argue whether global warming is the cause; most of them agree that it is. “Ten of the last 12 years were the warmest since 1850. The global temperature (since then) rose 0.7 degrees Celsius and most climate models suggest it's going to continue to warm by 2 to 5 degrees Celsius this century,” says Philip Jones, climate research professor at Britain's East Anglia University. He also adds that globally, sea levels are rising by around 1.5 millimeters (0.06 inches) per year and have risen some 20 centimeters (7.8 inches) since the late 19th century. Warmer seas due to global warming will most probably also cause changes in precipitation patterns and increase intensity of hurricanes. (The IPCC's Fourth Assessment draft text, which will be released next year, forecasts a 2–4.5° C warming by 2050—a faster change than their 2001 forecast of 1.4–5.8° C warming by 2100). [July 2006, [Military Implications, Sources](#)]



During the Climate Change Conference held in Nairobi many reports and papers documenting new climate change-related evidence and challenges were released. Noteworthy ones include: A report by German scientists is renewing the call on nations to promptly consider strategies for dealing with "sea level refugees"—population living in coastal areas endangered by the rising sea levels and increasing frequency of extreme storms. Canada's northern native peoples might become environmental refugees, being increasingly isolated as their ice roads and paths to supplies melt. [November 2006. [Military Implications, Sources](#)]

The US National Oceanic and Atmospheric Administration revealed that the CO<sub>2</sub> growth rate for 2006 was 2.05 ppm and the yearly average rise since 2001 was 2.1 ppm, meaning a faster accumulation in the atmosphere than scientists expected, and raising fears over the time available to tackle climate change. Preliminary data compiled by the World Meteorological Organization show that globally, the year 2006 is estimated to be the sixth warmest year since recordkeeping began in 1880. Also, 2006 registered the largest ever ozone hole area (September 21-30, 2006) and the second lowest average sea ice extent for the month of September. The organization notes that the September sea ice decline rate is about 9% per decade. Heat waves and droughts hit many parts of the world. The final figures will be released in March 2007. Newly released data by the World Glacier Monitoring Service reveal that in the period 2000–2005, mountain glaciers around the world melted at 1.6 times the average rate of the 1990s and 3 times that of the 1980s. A new study presents a doom-laden future for Europe, arguing that Europe is warming faster than the global average, and climate change will transform the face of the continent, affecting all sectors, but mainly its economy—particularly agriculture and tourism—and health.[January 2007. [Military Implications, Sources](#)]

Japan's Meteorological Agency announced that the ocean around Japan has warmed up by 0.7 to 1.6 degrees Celsius over the last century, far higher than the world average of 0.5 degree Celsius. [May 2007. [Military Implications, Sources](#)]

### Greenhouse Gas Emissions

The Global Carbon Project report shows that carbon dioxide emissions over the last five years grew four times faster than in the preceding 10 years. Global growth rates in 2000–05 reached 3.2%, compared to 1990–1999's 0.8%. The report also draws attention to environmental inertia, by which the environment stores up part of the energy generated by greenhouse gas emissions; causing global temperatures to continue to increase for two or more centuries after emissions are stabilized or begin to drop. [November 2006. [Military Implications, Sources](#)]

The American National Academy of Sciences found that CO<sub>2</sub> emissions grew faster than forecasted by the International Panel on Climate Change (IPCC). Between 2000 and 2004, worldwide CO<sub>2</sub> emissions increased at 3.1% per year, three times the 1.1 % per year during the 1990s. The growth was predominantly driven by developing and least-developed economies, which accounted for 73% of global emissions growth in 2004. [June 2007, [Military Implications, Sources](#)]

An international team of researchers has found that the Southern Ocean's capacity to absorb man-made carbon dioxide from the atmosphere is weakening, stating that this is the first time they have "convincing evidence that a change in the uptake of CO<sub>2</sub> by the oceans is linked to climate change." They didn't expect that to happen until much later in the 21st century. [May 2007. [Military Implications, Sources](#)]

At the same time, methane—22 times more powerful than CO<sub>2</sub> for global warming—is emitted as result of melting permafrost at a rate five times faster than thought, and could become a significant factor in global warming, representing a "a climate time bomb," warn scientists. Most of the methane-releasing permafrost is in Siberia. Another study reveals that carbon trapped in this type of permafrost could be 100 times the amount of carbon released into the air each year by the burning of fossil fuels.

Deep ice drilled out of Antarctica confirms that carbon dioxide levels are substantially higher now than at any time in the last 800,000 years. [September 2006. [Military Implications, Sources](#)]

A strategic focus on just the U.S. and China is the most efficient use of environmental lobbying power, said Dr. Jessica Matthews, President, Carnegie Endowment for International Peace, at a recent session at the Woodrow Wilson International Center for Scholars' Environment and Security Program. The magnitude of changes necessary to affect the growth of greenhouse gas emissions will require the leadership of the top two emitters. Without them, she argued, the changes in other countries are of insufficient significance. China may pass the U.S. in annual CO<sub>2</sub> emissions before the end of 2007. [March 2007. [Military Implications, Sources](#)]

### Melting Rate Increasing

New findings show that glaciers are melting fast around the world from Africa's Kilimanjaro—projected to completely disappear sometime in the next 20—50 years, to South America's Andes Mountains, Europe's Alps, and Asia's Himalayas. Tibet's glaciers may disappear within 100 years, threatening hundreds of millions of farmers in China's western regions. [December 2006, [Military Implications, Sources](#)]

NASA satellite observations revealed Greenland snow is melting faster than expected. In 2006, in some monitored areas there were 10 days more of melting snow than the average over the past 18 years. This is consistent with the pattern observed since 1988. "We need to do more. The situation is very dramatic," remarked European Commission President, José Manuel Barroso after visiting Greenland to personally observe the effects of global warming. The hunting and fishing season has shortened to four to five months compared to eight months a few years ago. The UN choice to celebrate World Environment Day 2007 in Tromsø, the Nordic Norway city, was to stress the global environmental impact of melting ice and snow and the role of satellite technology in identifying and analyzing long-term climatic trends and changes in polar regions. [June 2007, [Military Implications, Sources](#)]

Greenland's ice melting rate had tripled between April 2002 and November 2005, compared to the rate between 1997 and 2003, according to research by Jianli Chen and colleagues at the University of Texas in Austin and published in the journal Science. Although controversial, the results definitely indicate that rise in sea levels this century will likely be higher than originally

forecasted. "If the Greenland cap melted completely, it would raise global mean sea level by about 6.5 meters. If this were to occur, most of the world's coastal regions would be subject to flooding," warn the authors. Meanwhile, the glaciers of Southeast Alaska are shrinking twice as fast as previously estimated, according to a study by Fairbanks and Juneau glaciologists, published in the *Journal of Geophysical Research*. Sea ice is also melting at a record pace near the North Pole, due to a record hot summer that arrived in many northern settlements a full month earlier, following an unusually mild winter and spring, say locals. Inuit peoples of the far north in Canada began ordering air conditioning. The town of Kuujuaq, at about 1,500 kilometers north of Montreal, has purchased 10 air-conditioning units as the inside temperature reached 31° Celsius (88° F.) in late July. [September 2006. [Military Implications, Sources](#)]

Ice is melting at an increasing rate around the globe, and scientists warn that this might indicate that the effects of global warming are showing up faster than previously expected. Based on the latest calculations, Greenland ice loss increased by 250% between May 2004 and April 2006 compared with the two years between April 2002 and April 2004, which translates to an equivalent global sea level rise of about 0.5mm (0.02 inches) per year. Likewise, 95% of the glaciers in southeast Alaska (stretching from Yakutat Bay to the Stikine Icefield in British Columbia) are thinning at twice the rate that was previously estimated, according to a new study. [September 2006. [Military Implications, Sources](#)]

The National Snow and Ice Data Center reported that the North Pole ice melted again at a record rate this summer, meaning that the Arctic could be ice-free in summer far sooner than predicted a year ago. Similarly, based on data from Envisat's Advanced Synthetic Aperture Radar (ASAR), European scientists determined that around 5%-10% of the Arctic's perennial sea ice has been fragmented by late summer storms and the ice had retreated to the point of opening a navigation passage from northern Siberia or the Norwegian island of Spitzbergen to the North Pole. "If this anomaly trend continues, the North-East Passage or 'Northern Sea Route' between Europe and Asia will be open over longer intervals of time, and it is conceivable we might see attempts at sailing around the world directly across the summer Arctic Ocean within the next 10-20 years" says Mark Drinkwater of ESA's Oceans/Ice Unit. New evidence also suggests that Antarctica has warmed about 1.4° per century—a fact that was masked at the end of the 20th century by large temperature variations. [September 2006. [Military Implications, Sources](#)]

### Climate Models

A group of climate scientists from NASA and Columbia University Earth Institute found that climate change is "close to critical tipping points, with potentially dangerous consequences for the planet." In a related interview, Dr. James Hansen of NASA said that the point of no return might be reached as soon as in 10 years, if world governments fail to curb GHG emissions. He also noted that the IPCC report underestimated sea level rise, which, he warns, might reach 1-2 meters by the end of the century, if West Antarctic and Greenland melting are factored in. The *Dangerous human-made interference with climate: a GISS modelE Study* outlines two scenarios: 'business-as-usual', which shows disastrous consequences, and an 'alternative scenario' assuming controlled GHG emissions generating more moderate effects. [June 2007, [Military Implications, Sources](#)]

Global warming will increase the risk of natural disasters over the next two centuries, even if harmful emissions were cut now, warn climate scientists from the University of Bristol's Department of Earth Sciences. Compiling data from more than 52 climate models looking at the impact of greenhouse gas emissions, the researchers calculated the risks induced by climate change to the world's key ecosystems based on levels of warming (less than 2°C (3.6°F) to over 3°C (5.4°F)) and for each group assessed the probability of changes in forest cover, the frequency of wildfires, and changes to freshwater supplies over the next 200 years. The findings are expected to be used to explore measures to reduce hazards as much as possible. [August 2006. [Military Implications, Sources](#)]

A new study, Global temperature change, by a group of scientists, reveals that global surface temperature has increased approx. 0.2°C per decade in the past 30 years, and the world is the warmest it has been in the last 12,000 years. Scientists estimate that pollution from human activity, combined with the loss of snow and ice cover, will accelerate future temperature increase. Also, since warming is not uniform around the globe, the likelihood of strong El Niños and other harsh weather phenomena increases. A global temperature rise of approx. 1°C might represent a threshold with “dangerous” consequences, as sea levels rise and species become extinct. [September 2006. [Military Implications, Sources](#)]

Strong correlation between global warming and severe storms is also revealed by a study based on more than 80 simulations using 22 sophisticated computer models of the climate system. The simulations show with 84% probability that for the period 1906-2005, human activity—mainly greenhouse gas emissions—are responsible for about two-thirds of the temperature increases in hurricane formation regions of the Atlantic and Pacific Oceans. The research team that produced the study includes 19 hurricane and climate scientists from ten research centers. [September 2006. [Military Implications, Sources](#)]

A new index developed by scientists of the Swiss Federal Institute of Technology in Zurich, allows mapping the different ways that climate change will affect different parts of the world. This is the first map to show how global warming combined with natural variations in the climate would affect our planet, highlighting the frequency of extreme climate events—such as heat waves and floods—by 2100 compared with the late 20th century. It is intended to “help policy-makers gain a quick overview of the scientific facts without getting lost in the detail,” says Michèle Bättig, member of the team. [January 2007. [Military Implications, Sources](#)]

New research and models by the National Center for Atmospheric Research and the University of Colorado's National Snow and Ice Data Center found that the Arctic could be seasonally free of sea ice by 2020, 30 years sooner than predicted by the IPCC report. In addition to all the consequences for the ecosystem and the Nordic inhabitants, this might accelerate even more global warming, as reflection of the sun's heat and light will be strongly diminished. [May 2007. [Military Implications, Sources](#)]

## Climate Change Effects

### Increasing Risk of Natural Disasters

"The world has moved from a global threat once called the Cold War, to what now should be considered the Warming War," Afelee Pita, Tuvalu Ambassador to the UN, told the Security Council in warning of the threat of rising sea levels to small island nations such as his country. The first session of the multi-stakeholder Global Platform for Disaster Risk Reduction was held in Geneva, June 5-7, 2007. Focusing on systematic implementation strategies of the "Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters," the session highlighted the need for raising awareness and stimulating action at government and grassroots levels for improving disaster reduction preparedness in areas increasingly vulnerable to risk. The meeting's outcomes will be presented at the 62nd UN General Assembly. The next meeting of the Global Platform is planned for 2009. [June 2007. [Military Implications, Sources](#)]

*Climate Change 2007: Impacts, Adaptation and Vulnerability*, third report of the UN Intergovernmental Panel on Climate Change (IPCC), calls for quick action to stabilize greenhouse gas emissions in order to avoid the worst climate change impacts. It states that greenhouse gas emissions must start declining by 2015 if the increase in global average temperature is to be capped at 2–2.4 degrees Celsius. The report points out that the more time passes, the costlier it will be. It estimates that stabilizing emission levels at 445–535 parts per million (ppm) would cost between 0.2% and 3% of world GDP by 2030 (about 0.12% per year); while after 2050, stabilizing emissions between 445–710 ppm would require a reduction of 5.5% in the world's GDP. This is consistent with the Stern report and other estimates. The report highlights that multiple strategies are already available for reducing global greenhouse gas emissions, such as utilizing cost-effective policies and current and emerging technologies. Just before the IPCC report was released, the World Wildlife Fund issued its own report, *Stop Climate Change: It Is Possible*, which presented 15 actions to reduce CO<sub>2</sub> emissions. The World Resources Institute analyzed the impact of climate change on the ecosystem and its services for humans and suggested actions for ecosystem restoration in its report *Restoring Nature's Capital: An Action Agenda to Sustain Ecosystem Services*. WRI president Jonathan Lash said we should "urgently expand the climate debate beyond reducing greenhouse gases to focus on how climate change is altering ecosystem services." [May 2007. [Military Implications, Sources](#)]

In addition to melting glaciers, global warming is causing the volume of seawater to expand, rising the sea level. The U.N. Intergovernmental Panel on Climate Change projects that sea levels would rise by 18 to 59 centimeters (7 to 23 inches) by the end of this century. A new World Bank working paper, *The impact of sea level rise on developing countries: a comparative analysis*, estimates that sea levels could rise 1-3m by the end of the century, but even 5m could be possible in the event of an unexpectedly rapid breakup of the Greenland and West Antarctic ice sheets. In a comprehensive assessment of the consequences of sea level rise for 84 developing countries, the paper estimates that a one meter rise by the end of the century would displace hundreds of millions of people in the developing world, generating at least 60 million environmental refugees. The impacts are potentially catastrophic for some countries such as Vietnam, Egypt, and the Bahamas, while for larger ones such as China the absolute magnitudes are huge. The most affected regions will be East Asia, the Middle East, and North Africa. The



paper warns that the severity of the situation is increased by inadequate attention from the international community in addressing the implications and planning for adaptation. Maldivian President Maumoon Abdul Gayoom warned that at only 1.5m above sea level, the Maldives are at risk of disappearing from increasing sea levels due to global warming, forcing over 300,000 refugees to migrate. An internal report of the Royal Canadian Mounted Police, External Trends Influencing Policing in B.C., notes that implications of climate change could pose serious challenges for the police in British Columbia from local disorder during natural disasters increasingly affecting coastal areas, to climate refugees fleeing flooded countries. The report notes that “mass movements of that kind” might require increasing military and policing actions. Meanwhile, critical water scarcity could impact between 1.1 and 3.2 billion people by 2100, notes an IPCC report to be published in April. Melting glaciers are endangering future water supplies to farming areas around the world, from the Andes to the Himalayas and Kilimanjaro. [February 2007. [Military Implications, Sources](#)]

Prior to the G8 Summit, representatives of 20 leading financial service companies—members of the UNEP Finance Initiative—called on G8 leaders to adopt deep emission reduction targets no later than 2009. They highlighted that in addition to climate-related disaster consequences for human security, inaction could lead to annual economic losses of as much as \$1 trillion by 2040. However, the economic aspect is just a small part of the post-disaster suffering, highlights the Worldwatch Institute report, *Beyond Disasters: Creating Opportunities for Peace*. The report notes that over the past decade, there were an average of 348 disasters per year—nearly one per day—with 1 billion people affected by floods alone. In 2006, human deaths from natural disasters were up 24% and 87 countries were affected by floods, which were responsible for most weather-related disasters. Sophisticated Japanese and Taiwan computer models show that tropical storms—typhoons—in the highly populated areas of the northwest Pacific will be getting worse for the next 100 years. [June 2007. [Military Implications, Sources](#)]

The UN University report *Re-thinking Policies to Cope with Desertification* warns that desertification reached global environmental crisis proportions and is representing “imminent threats to international stability.” Unless appropriate mitigation strategies are implemented, about 2 billion people might be affected by desertification effects; and, over the next decade, 50 million might be displaced. [June 2007. [Military Implications, Sources](#)]

Accelerating temperature rise over the past 10 years increased the drought in Australia—worse in the most populated areas—so that the situation got to national crisis proportions. Although equipped with the highest water storage capacity per capita in the world, in the major cities supply might fall 40% short of demand by 2025 due to growing population and possibly more severe drought. In China, because of drought, more than 8 million people are short of water, and many livestock perish. In Sichuan province, armed police deliver water to the nearly 4 million people affected by severe drought. [June 2007. [Military Implications, Sources](#)]

The European Commission Green Paper ‘Adapting to Climate Change in Europe - Options for EU Action’ warns that unless advanced planning occurs, European countries will suffer “increasingly frequent crises and disasters” that will “threaten Europe’s social and economic systems and its security.” [June 2007. [Military Implications, Sources](#)]



### Changes in Disease Patterns

Scientists increasingly note the emergence of fatal diseases in places where they were never seen or expected before, heightening concerns that climate change favors the spread of viruses, bacteria, insects, and plants to cold areas where local organisms do not have immunity to fight them. A fungus normally found in tropical or subtropical regions, *Cryptococcus gattii*, has suddenly become endemic on Vancouver Island, on the Pacific coast of Canada, sickening humans and animals. Oysters in Alaska are being infected by the bacterium *Vibrio parahaemolyticus* specific to warmer waters, like the Gulf of Mexico. In Africa, mosquitoes are causing malaria in high villages at Mt. Kenya that had never been exposed to it before. IPCC's 4th Assessment Report, *Climate Change 2007*, warns that global warming might trigger unprecedented health risks such as the spread of mosquito-borne illnesses like malaria, dengue fever, yellow fever and encephalitis; increased respiratory illnesses due to pollen and mold spores; and health problems induced by increased flooding and drought. [February 2006.

[Military Implications, Sources](#)]

Some diseases such as malaria, heart ailments and dengue fever appear on the rise with warmer temperatures, reported health experts, citing surges of such diseases in Kenya, China and Europe. Adaptation and Vulnerability to Climate Change: The Role of the Finance Sector, a report by UNEP, warns that by 2040, there will be a "peak year" in which losses from extreme weather could reach \$1 trillion and calls for a financing mechanism that would help developing countries cope with the effects of climate change. [November 2006. [Military Implications, Sources](#)]

## **NEW ORGANIZATIONS WITH MANDATES WITH EVENTUAL ES IMPLICATIONS**

### **Global Facility for Disaster Reduction and Recovery to Mitigate Impact of Natural Disasters**

The Global Facility for Disaster Reduction and Recovery, set up by the UN International Strategy for Disaster Reduction in cooperation with the World Bank, is a new initiative aiming to improve preparatory and recovery actions to lower the risks and consequences of natural disasters. The Facility will mainly ensure that disaster risk reduction is considered a priority in development projects in countries at risk, and will provide expertise and technical assistance for including risk reduction in strategic planning. The World Bank Global Hotspots Study identifies 86 vulnerable countries with risks of high mortality and economic loss. [See also *ICSU Launched Global Disaster Research Program* in October 2005, and *New Developments for Addressing Natural Disasters* in July 2005 environmental security reports.] [October 2006. [Military Implications, Sources](#)]

### **FAO Launched New Crisis Management Centre**

In collaboration with the World Organisation for Animal Health, the UN Food and Agriculture Organization launched a new Crisis Management Centre to fight avian influenza outbreaks and other major animal health or food health-related emergencies. The center continuously monitors disease information around the globe and is able to respond in less than 48 hours, when a suspected outbreak is reported. [See also *Bird Flu Spreads Increasing Threats of a Human*

*Pandemic* in February 2006 and other previous environmental security reports on this issue.] [October 2006. [Military Implications, Sources](#)]

### **WHO-sponsored pandemic flu task force holds first meeting in Geneva**

The Ad Hoc Influenza Pandemic Task Force held its first meeting to discuss best actions in case of an outbreak. The Task Force is providing independent risk assessments and advising WHO on possible measures to be taken. These could include rapid containment effort, warning governments of risks and accelerating vaccine production. The Task Force includes 21 experts and will function until June 15, 2007, when WHO's revised International Health Regulations come into effect. [October 2006. [Military Implications, Sources](#)]

### **UN Creates Secretariat of the Global Bioenergy Partnership at FAO**

The recently inaugurated Secretariat of the Global Bioenergy Partnership (GBEP) will help UN efforts to promote “green” fuels by facilitating a global political forum to support bioenergy production, marketing and use, and assisting international exchanges of know-how and technology. The focus will be mainly on helping developing countries’ governments and institutions formulate sustainable bio-energy policies and strategies to help reduce dependency on fossil fuel, as well as encouraging investments in multilateral projects for bio-energy development. It will also assist in formulating guidelines for measuring greenhouse gas emission reductions due to the use of bio-fuels. The GBEP Secretariat is located at the UN Food and Agriculture Organization headquarters in Rome and is supported by the Italian Ministry for the Environment, Land and Sea. [See also *UN Commission on Sustainable Development Fosters Energy Security* in May 2006 environmental security report.] [September 2006. [Military Implications, Sources](#)]

### **‘3R’—Reduce, Reuse and Recycle New Environmental Think Tank for Asia**

The ‘3R’—Reduce, Reuse and Recycle—is a new initiative launched by the Asian Development Bank, Asian Institute of Technology, UNEP, and the UN Economic and Social Commission for Asia and the Pacific (UNESCAP) to promote sustainable use of natural resources and increase environmental efficiency. The center will be located at the Asian Institute of Technology in Bangkok. It will function as a think tank on environmental technology, knowledge dissemination, research capacity building, regulations, and policy related to 3R practices in cooperation with other related Asian initiatives. [August 2006. [Military Implications, Source](#)]

### **Asian Consortium on Non-traditional Security Issues**

The Consortium of Non-traditional Security Studies in Asia (NTS-Asia) is made up of 14 research institutes and think tanks from Asia that will study issues including efforts to tackle pandemics, environmental degradation, and cooperation during disasters resulting from climate changes. Climate change, the avian flu, and other “invisible, diverse, and unpredictable” threats are becoming a top security concern in many Asian countries. The consortium will be hosted by Singapore and plans to hold annual conferences on non-traditional security issues with peer institutes from the U.S. and Europe. [January 2007. [Military Implications, Sources](#)]

## **UN StEP Initiative for Reducing E-Waste**

Solving the E-waste Problem (StEP) is a global public-private initiative coordinated by the United Nations University with the overall aim of improving e-waste management by creating global standards for e-scrap and recycling. The partnership includes various UN organizations, major high-tech manufacturers, and governmental, NGO and academic institutions, along with recycling/refurbishing companies. Five task forces will help shape new e-waste standards: Policy & legislation (assessment of current e-waste policies and recommendations for future strategies); ReDesign (improve electronics design for better reuse, repair, refurbishment and recycling); ReUse (development of a global reuse system to minimize environmental impacts) ReCycle (develop sustainable e-waste recycling systems); and Capacity building (globally accessible documentation on e-waste). The initiative was officially launched on March 7. [See also *UN E-Waste Forum and Basel Convention's Conference of Parties, Toxic Waste Disposal of Global Growing Concern in September 2006*, *WEEE Comes into Effect*, and other related items.] [March 2007. [Military Implications, Sources](#)]

## **NEW INITIATIVES AIMING TO INCREASE ECO-EFFICIENCY**

### **Switching to Green: A renewable energy guide for office and retail companies**

The World Resources Institute (WRI) published a guidebook, *Switching to Green: A renewable energy guide for office and retail companies*, to provide organizations with easily understandable information on how to switch to renewable energy. [October 2006. [Military Implications, Source](#)]

### ***Cleantech Report*<sup>TM</sup> by Lux Research**

*Cleantech Report*<sup>TM</sup> by Lux Research is a comprehensive analysis of emerging energy and environmental technologies with information ranging from statistics to funding and policies on cleantech. It notes that cleantechs are rapidly expanding; 1,500 cleantech start-ups operate worldwide, there were 29,874 cleantech-related scientific journal articles published in 2006, and 4,093 patents issued in the U.S. alone. [June 2007. [Military Implications, Source](#)]

### **Idle Nighttime Computers Cited as Energy Wasters**

A new report released by the energy management firm 1E and the Alliance to Save Energy points out the large amount of energy now being wasted by idle computers left running at night. The study calculated that 14.4 million tons of CO<sub>2</sub> could be eliminated annually from atmospheric pollution in the U.S. if all of these machines were turned off when not being used for extended periods. [June 2007. [Military Implications, Sources](#)]

## **2. Military Implications and Sources**

### **A Preventing or repairing military damage to the environment**

#### **ENVIRONMENTAL SECURITY RISES ON THE INTERNATIONAL POLITICAL AGENDA**

##### **UN General Assembly 61st Session Pinpoints Global Warming as a Central Issue for Security**

###### *Military Implications:*

In addition to the military implications of the increasing scientific evidence of climate change listed in previous Millennium Project monthly reports, the military should consider the opportunities created for collaboration on preparedness strategies; as well as, the increased political attention to the polluter pays principle.

###### *Source:*

UN General Assembly 61st Session, General Debate (19-29 September 2006)  
webcasts and texts of statements <http://www.un.org/ga/61/>

##### **UN Conflict Prevention Strategy Includes Environmental Dimension**

###### *Military Implications:*

Relevant military personnel should study the Progress report to see if there are preventive measures that might be adapted to improve military practice and better anticipate emerging issues in UN policies to prevent conflicts, and to explore new areas for cooperation.

###### *Sources:*

Annan maps out ways to bolster UN ability to prevent armed conflict, save lives  
<http://www.un.org/apps/news/story.asp?NewsID=19587&Cr=Armed&Cr1=>  
Progress report on the prevention of armed conflict. Report of the Secretary-General  
<http://www.un.org/Docs/journal/asp/ws.asp?m=A/60/891> (select “English”)

##### **UK Initiates UN Security Council Debate on Climate Change and Security**

###### *Military Implications:*

Environmental security is likely to become a more common area for UN Security Council action; hence, the military should consider how this could change the nature, composition, and training requirements of future peacekeeping missions related to environmental security. This is not an issue of whether or what part of climate change is caused by humans, but of the consequences of scientifically documented climate change and actual impacts on societies.

###### *Sources:*

Security Council Holds First-Ever Debate on Impact of Climate Change on Peace, Security, Hearing Over 50 Speakers  
<http://www.un.org/News/Press/docs/2007/sc9000.doc.htm>  
Secretary-General Ban's Statement in Security Council Debate on Climate Change  
<http://www.reformtheun.org/index.php?module=uploads&func=download&fileId=2262>

U.N. Security Council holds climate debate

<http://edition.cnn.com/2007/TECH/science/04/17/climate.un.britain.ap/>

U.N. Council Hits Impasse Over Debate on Warming. The NY Times

<http://www.nytimes.com/2007/04/18/world/18nations.html?ex=1334548800&en=599119af2640e7b1&ei=5088&partner=rssnyt&emc=rss>

Global warming an issue for UN Security Council

<http://environment.newscientist.com/article/dn11619-global-warming-an-issue-for-un-security-council.html>

'Environmental security' essential

<http://www.guardian.co.uk/uklatest/story/0,,-6568208,00.html> (article available for a limited time)

U.S. Rejects Call for Tougher U.N. Environment Role

<http://www.enn.com/today.html?id=12588>

UN Security Council to Debate Climate Change

<http://www.planetark.com/dailynewsstory.cfm/newsid/41268/story.htm>

### Britain to Push on Adding Climate Change to Security Council Agenda

*Sources:*

British push on CO2 at Security Council

<http://environment.guardian.co.uk/climatechange/story/0,2028872,00.html>

Britain puts climate change on UN agenda

[http://www.timesonline.co.uk/tol/news/world/us\\_and\\_americas/article1485323.ece](http://www.timesonline.co.uk/tol/news/world/us_and_americas/article1485323.ece)

### **UN Security Council Adds Natural Resources Management and Environmental Issues to Future Peacekeeping Missions**

*Military Implications:*

Military peacekeeping liaisons should be made aware of experts on relevant natural resources and environmental issues who might be available to aid future peacekeeping missions. Such experts and peacekeeping commanders should be queried to see if there are any special needs for training and standards for such missions. It would be wise to apply similar approaches to pre-conflict situations, as conflict prevention tools.

*Source:*

Security Council Underscores Need for Peacekeeping Mandates to Consider Helping States Prevent Illegal Exploitation of Natural Resources from Fuelling Conflict

<http://www.un.org/News/Press/docs/2007/sc9060.doc.htm>

### **New UN Secretary-General Announced Climate Change a Top Priority**

*Military Implications:*

The military should take advantage of this changing political environment to launch a higher national and international profile for the *Army Strategy for the Environment* and go into greater detailed planning to carry it out. The public still remains quite unaware of how far along the Army has moved in policy and practice compared to many other public and private institutions.

*Sources:*

UN official proposes global summit on climate change to plan next steps

<http://www.un.org/apps/news/story.asp?NewsID=21244&Cr=climate&Cr1=change>

UN's Ban Urged to Lead Global Climate Change Plans

<http://www.planetark.com/dailynewsstory.cfm/newsid/39865/story.htm>

New U.N. chief on first overseas tour

<http://www.upi.com/InternationalIntelligence/view.php?StoryID=20070124-040725-7303r>

World Economic Forum Annual Meeting 2007. The Shifting Power Equation

<http://www.weforum.org/en/events/AnnualMeeting2007/index.htm>

Could Corporate America take the lead in Climate Change?

<http://www.euractiv.com/en/energy/corporate-america-take-lead-climate-change/article-161093>

Army Strategy for the Environment

<http://www.aepi.army.mil/pubs-strategic.html>

## **UN Appoints Special Envoys for Climate Change**

### *Military Implications:*

[Similar to previous on related issues] Environmental security is likely to get increasing attention in the UN and other international forums. The military should consider how this could change the nature, composition, and training requirements of future peacekeeping missions related to environmental security. This is not an issue of whether or what part of climate change is caused by humans, but of the consequences of scientifically documented climate change and actual impacts on societies.

### *Sources:*

Ban Ki-moon names 3 prominent Special Envoys on Climate Change

<http://www.un.org/apps/news/story.asp?NewsID=22410&Cr=climate&Cr1=change>

Secretary-General Appoints Three New Special Envoys on Climate Change

<http://www.un.org/News/Press/docs//2007/sga1061.doc.htm>

U.N. appoints three envoys on climate change

[http://www.usatoday.com/news/world/environment/2007-05-01-un-climate\\_N.htm](http://www.usatoday.com/news/world/environment/2007-05-01-un-climate_N.htm)

Climate change must be tackled at the international political level, say UN envoys

<http://www.un.org/apps/news/story.asp?NewsID=22483&Cr=climate&Cr1=change>

## **UNEP Governing Council/Global Ministerial Forum Makes Progress on Global Environmental Governance**

### *Military Implications:*

Military personnel with environmental security responsibilities should review the GC-24/GMEF decisions for areas of potential cooperation, as well as their potential for triggering future environmental regulations.

### *Sources:*

GC-24/GMEF website GC-24/GMEF website

Environment Ministers Rise to the Challenge of Globalization and UN Reform

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=499&ArticleID=5526&l=en>

Summary Of the 24th Session of the UNEP Governing Council/Global Ministerial Environment Forum: 5-9 February 2007 <http://www.iisd.ca/vol16/enb1660e.html>



## **Controversy over a United Nations Environmental Organization Continues**

### *Military Implications:*

Considering the rising concern over the importance of environmental issues for global security, and the need for a better international coordination of funds, research, and governmental guidance, it is likely that the debate for a stronger UN environmental agency will continue. In anticipation of such increased coordination, the military should: 1) consider developing a list of environmental security related priorities whose progress would be enhanced by such international coordination and 2) ask to participate in discussions/negotiations.

### *Sources:*

U.S. Rejects Call for Tougher U.N. Environment Role

<http://www.enn.com/today.html?id=12588>

Security Council Holds First-Ever Debate on Impact of Climate Change on Peace, Security, Hearing Over 50 Speakers

<http://www.un.org/News/Press/docs/2007/sc9000.doc.htm>

## **OSCE to Develop an Environmental Security Strategy**

### *Military Implications:*

The militaries of OSCE countries are likely to be called upon to further detail their roles in environmental security. This is an opportunity for the US Army's Strategy on the Environment to be used as a discussion document in this process. Russia and the CIS (Commonwealth of Independent States) were among the first to have a definition of environmental security; hence, military collaboration should be fruitful. If not already done, the relevant military personnel should contact the Office of the Coordinator of OSCE Economic and Environmental Activities and the Environment and Security (ENVSEC) Initiative to collaborate on further development of the environmental security strategy and its implementation.

### *Sources:*

OSCE meeting transforms concern about environment security into action

[http://www.osce.org/eea/item\\_1\\_24652.html](http://www.osce.org/eea/item_1_24652.html)

OSCE meeting fosters co-operation to reduce environmental threats, says Chairman

[http://www.osce.org/eea/item\\_1\\_24589.html](http://www.osce.org/eea/item_1_24589.html)

## **UK Defence Ministry Highlights the Link between Environment and Security**

### *Military Implications:*

Relevant military personnel should study the report for useful insights to improve U.S. military environmental strategy and assess how the military could coordinate with USAID and other potential partners on sustainability issues.

### *Sources:*

Ministry of Defense Sustainable Development Annual Report 2005

<http://www.mod.uk/DefenceInternet/AboutDefence/WhatWeDo/HealthandSafety/DSC/SustainableDevelopmentAnnualReport2005.htm>

Map on Oversea Deployment and Environmental Change in UK MoD, *Sustainable Development Report 2005*

## **Civil Society Regional Consultations Worldwide Prior to the Global Ministerial Environment Forum**

### *Military Implications:*

Review of the outputs of those recent meetings and subsequent discussions provides an important heads up on the agenda and issues to be discussed and the potential for new environment-related regulations likely to arise in the UNEP February 2007 Forum. If military cooperation with environmental NGOs is likely to increase, then a review of the positions of various NGOs in these meetings could provide information for deciding which environmental NGOs to cooperate with about what, and where in the world.

### *Sources:*

Civil Society Regional Consultations Take Off in Geneva

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=392&ArticleID=5396&l=en>

Civil Society Regional Consultations Take Off in Nairobi

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=392&ArticleID=5398&l=en>

## **UK Scientists List 100 Most Vital Ecological Policy Questions**

### *Military Implications:*

It is very likely that this list, published in the August 2006 issue of the Journal of Applied Ecology, will serve as a source of future UK and EU environmental regulatory efforts. Military personnel should review the list and the accompanying material to determine which of these problems may have military applications and implications.

### *Source:*

The key questions at the heart of the UK's environmental future

<http://www.guardian.co.uk/science/story/0,1854855,00.html>

## **Environment a Key Element in the First European 18-month Work Program**

### *Military Implications:*

Relevant military personnel with environmentally-related responsibilities in Europe should review the Program for eventual implications for operational planning and training.

### *Source:*

EU 18-months Work Programme

[http://www.eu2007.de/en/The\\_Council\\_Presidency/Priorities\\_Programmes/index.html](http://www.eu2007.de/en/The_Council_Presidency/Priorities_Programmes/index.html)

## **The Institute for Environmental Security in The Hague to Hold Annual Peace and Sustainability Sessions**

### *Military Implications:*

Copies of the Army Strategy for the Environment should be sent to the conference organizers. If not already doing so, relevant military personnel should consider attending the annual Peace and Sustainability Sessions. The recommendations of these sessions should be widely publicized among military forces involved in conflict prevention, mitigation, and post-conflict rebuilding.

### *Source:*

Forces for Sustainability Launch of the Peace and Sustainability Sessions

<http://www.envirosecurity.org/sustainability/>

## **French President Jacques Chirac issues Paris Call for Action for Global Ecological Governance**

### *Military Implications:*

Considering the high level of the participants and President Chirac's commitment, it is likely that some of the elements in the call for action may shape new international agreements; and hence the Call for Action and how it is used by the French President and other leaders is a useful indicator of changes in environmental politics.

### *Sources:*

"Citizens of the Earth" Conference <http://www.citoyensdelaterre.fr/conference/?-English->

"Citizens of the Earth" Conference for Global Ecological Governance

<http://www.citoyensdelaterre.fr/conference/?PARIS-CALL-FOR-ACTION>

Green Cross International defends the right to water at the Paris Conference for Global Ecological Governance

<http://www.greencrossinternational.net/en/comm/news/2007/5.html>

UN officials urge global push to reverse environmental damage

<http://www.un.org/apps/news/story.asp?NewsID=21440&Cr=climate&Cr1=change>

## **Climate Change a Serious Threat to Security, Conclude Eminent Military Officers**

### *Military Implications:*

Although the military is well aware of the report and its findings, it is added here due to its importance to the overall record of developing international issues of environmental security.

### *Sources:*

National Security and the Threat of Climate Change

<http://securityandclimate.cna.org/report/National%20Security%20and%20the%20Threat%20of%20Climate%20Change.pdf>

Climate Change Poses Serious Threat to U.S. National Security

<http://securityandclimate.cna.org/news/>

Could global warming cause war?

<http://www.csmonitor.com/2007/0419/p02s01-usgn.html>

## **Report on Environment, Security, and Sustainable Development**

### *Military Implications:*

The IES report is worth reviewing, as a source of information on European environmental security policies and activities, as well as for influences leading to establishment of future strategies. It might also provide useful ideas for other regions.

### *Sources:*

Inventory of Environment and Security Policies and Practices (IESPP)

<http://www.envirosecurity.org/ges/inventory/>

Inventory of Environment and Security Policies and Practices

[http://www.envirosecurity.org/ges/inventory/IESPP\\_Full\\_Report.pdf](http://www.envirosecurity.org/ges/inventory/IESPP_Full_Report.pdf)

## **New Environmental Security Blog**

### *Military Implication*

While the Millennium Project staff regularly checks the blog and reports key insights, relevant military personnel should also check or subscribe to this blog for updates on new environmental security issues and resources.

### *Sources:*

The New Security Beat: <http://newsecuritybeat.blogspot.com/>

ECSP Launches Blog on New Security Threats

New Security Beat Provides Latest on Population, Environment, Security in the News

[http://www.wilsoncenter.org/index.cfm/topics/index.cfm?topic\\_id=1413&fuseaction=topics.item&news\\_id=224705](http://www.wilsoncenter.org/index.cfm/topics/index.cfm?topic_id=1413&fuseaction=topics.item&news_id=224705)

## **CONFLICT AND POST-CONFLICT ENVIRONMENTAL SECURITY ISSUES**

### **Protocol V on Explosive Remnants of War (ERW) of the Convention on Certain Conventional Weapons came into force on 12 November 2006**

#### *Military Implications:*

While the U.S. is not yet a party to Protocol V, it would be wise to assume and plan for the seeming eventuality that future international agreements will begin to include retroactive responsibilities. Protocol V is another example of the increasing international consensus in favor of the “polluter pays” principle. Protocol V has no clear implementation mechanisms or deadlines. To provide some leadership, if not already in existence, relevant military personnel might be tasked to create an information system to help responsible countries prioritize their future cleanup operations and, in anticipation, their legacy remnants of war.

#### *Sources:*

CCW Protocol V on Explosive Remnants of War Enters into Force

[http://www.icbl.org/layout/set/print/news/ccw\\_protocol\\_v](http://www.icbl.org/layout/set/print/news/ccw_protocol_v)

Protocol on Explosive Remnants of War (Protocol V to the 1980 Convention), 28 November 2003 <http://www.icrc.org/ihl.nsf/INTRO/610>

Portfolio of Mine Action Projects <http://www.mineaction.org/section.asp?s=projects>

Annan hails entry into force of new pact on speedy clearance of unexploded weaponry

<http://www.un.org/apps/news/story.asp?NewsID=20588&Cr=landmine&Cr1>

The need for urgent international action on cluster munitions

<http://www.icrc.org/web/eng/siteeng0.nsf/htmlall/cluster-munition-statement-061106?opendocument>

Perils of unexploded remnants of war stressed in UN mine report

<http://www.un.org/apps/news/story.asp?NewsID=20601&Cr=mines&Cr1>

### **Progress Made on Banning Cluster Bombs**

#### *Military Implications:*

The military should be prepared for possible requirements to phase out cluster munition use and to intensify efforts for helping other countries and regions do the same and/or deal with the after effects.

#### *Sources:*

Oslo Conference on Cluster Munitions, 22-23 February 2007

<http://www.regjeringen.no/en/ministries/ud/Selected-topics/Humanitarian-efforts/The-Norwegian-Governments-initiative-for/conference.html?id=449312&epslanguage=EN-GB>

Declaration - Oslo Conference on Cluster Munitions, 22 - 23 February 2007

<http://www.norway.org.et/policy/cluster/Declaration+on+Cluster+Munitions.htm>

Cluster Munitions: Statement to the Canadian Standing Committee on Foreign Affairs and International Development (by Steve Goose co-chair of the Cluster Munition Coalition)

<http://hrw.org/english/docs/2007/03/01/canada15442.htm>

Belgium criminalizes investment in cluster bomb manufacturers

<http://jurist.law.pitt.edu/paperchase/2007/03/belgium-criminalizes-investment-in.php>

Cluster Munitions Civilian Protection Act of 2007 (Introduced in Senate) S 594 IS

<http://thomas.loc.gov/cgi-bin/query/z?c110:S.594>:

## **International Crisis Group to Debate Considering Climate Change Variable in Conflicts**

### *Military Implications:*

Conclusions from this assessment should be reviewed by relevant military personnel with environmental security-related responsibilities.

### *Sources:*

Rainfall records could warn of war

<http://environment.newscientist.com/channel/earth/mg19426064.500?DCMP=NLC-nletter&nsref=mg19426064.500> (by subscription)

## **Hezbollah-Israeli War Threatens an Already Precarious Environment**

### *Military Implications:*

Military liaisons with Arab countries should explore the possibilities of convening a regional or pan-Arab conference on environmental security. This could be an opportunity to further the Army Strategy on the Environment and communicate its value in the region. The conference might be hosted by Egypt, as part of post-conflict planning. Exploratory meetings should include those responsible for implementing the Abu Dhabi Declaration. Since 2006 is the International Year for Deserts and Desertification, military liaisons in the region might also explore how such an environmental security conference might build upon or complement plans already underway in relation to the international year.

### *Sources:*

Environmental 'crisis' in Lebanon

<http://news.bbc.co.uk/2/hi/science/nature/5233358.stm>

UN environment agency backs response to Lebanon oil slick emergency

<http://www.un.org/apps/news/story.asp?NewsID=19351&Cr=Leban&Cr1=>

Rescue Lebanon's Coast; Oil Spill Crisis

<http://www.moe.gov.lb/rescuelebanon.htm>

Abu Dhabi Declaration on Environment and Energy

<http://www.unep.org/bh/Publications/DTIE%20Final/AbuDhabiDeclarationEn.pdf>

Environmental Sustainability Index

[http://www.yale.edu/esi/ESI2005\\_Main\\_Report.pdf](http://www.yale.edu/esi/ESI2005_Main_Report.pdf)

"Environmental Sustainability in the Arab World"

[http://www.yale.edu/envirocenter/Environmental%20Sustainability%20in%20the%20Arab%20World\\_Esty%20Levy%20and%20Winston.pdf](http://www.yale.edu/envirocenter/Environmental%20Sustainability%20in%20the%20Arab%20World_Esty%20Levy%20and%20Winston.pdf)

## Addressing Post-Conflict Environmental Security Issues

### *Military Implications:*

The international community is still paying for environmental cleanups for past conflicts. Since weapons and technologies steadily become more sophisticated, resulting damages are worse and so are costs of restoration, mainly those of the environment. Hence, it is likely that there will be increasing pressure for increased precision with decreased environmental impact in future R&D products. Events with consequences, such as the oil spill in Lebanon, are likely to increase calls for updating laws, assigning liability, and defining redress issues concerning environmental damages in war. [See also related items in *Conflict and Post-Conflict Environmental Security Issues* section of *Chapter 9.1 Emerging Environmental Security Issues* on the CD accompanying the 2006 *State of the Future* report by the ACUNU Millennium Project]

### *Sources:*

UN environment agency set to begin aerial surveillance of Lebanese oil spill

<http://www.un.org/apps/news/story.asp?NewsID=19577&Cr=Leban&Cr1=>

Lebanon Oil Spill Cleanup May Take A Year

[http://www.terraily.com/reports/Lebanon\\_Oil\\_Spill\\_Cleanup\\_May\\_Take\\_A\\_Year\\_999.html](http://www.terraily.com/reports/Lebanon_Oil_Spill_Cleanup_May_Take_A_Year_999.html)

UN reparations panel pays out nearly \$396.5 million for Iraq's invasion of Kuwait

<http://www.un.org/apps/news/story.asp?NewsID=19318&Cr=Iraq&Cr1=>

## Environmental Legacy of Hezbollah-Israeli War

### *Military Implications:*

[Similar to previous on the same issue] The international community is still paying for environmental cleanups for past conflicts. It is likely that there will be increasing pressure for increased precision with decreased environmental impact in future R&D products, updating laws, assigning liability, and defining redress issues concerning environmental damages in war. [See also related items in *Conflict and Post-Conflict Environmental Security Issues* section of *Chapter 9.1 Emerging Environmental Security Issues* on the CD accompanying the 2006 *State of the Future* report by the ACUNU Millennium Project]

### *Sources:*

UNEP Report Highlights Environmental Legacy of the Lebanon Conflict

<http://unep.org/Documents.Multilingual/Default.asp?DocumentID=498&ArticleID=5499&l=en>

Lebanon—Post-Conflict Environmental Assessment

[http://unep.org/pdf/Lebanon\\_PCOB\\_Report.pdf](http://unep.org/pdf/Lebanon_PCOB_Report.pdf)

Global conference pledges billions of dollars for Lebanon

<http://www.iht.com/articles/ap/2007/01/25/europe/EU-GEN-Europe-Funding-Lebanon.php>

Paris, France, 25 January 2007 - Secretary-General's remarks at International Donor Conference on Reconstruction in Lebanon

<http://www.un.org/apps/sg/sgstats.asp?nid=2420>

## **Environment to Get Crucial Role in Sudan's Future Peace and Prosperity Strategy**

### *Military Implications:*

Lessons learned by military and their civilian contractors from post-conflict environmental reconstruction activities should be shared with UNEP and relevant Sudanese officials, as should



offers of military-to-military assistance in environmental reconstruction when more stable conditions prevail.

*Source:*

UN Environment at Sudan National Planning Environmental Management Workshop  
<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=483&ArticleID=5313&l=en>

### UNEP Warns No Peace in Sudan without Environmental Management Plan

*Military Implications:*

Military planning for Sudan should include environmental planning and capacity-building experts in operations.

**Sources:**

Darfur conflict heralds era of wars triggered by climate change, UN report warns

<http://environment.guardian.co.uk/climatechange/story/0,,2109490,00.html>

Environmental Degradation Triggering Tensions and Conflict in Sudan

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=512&ArticleID=5621&l=en>

### **Report on Lebanon After-war Environmental Assessment**

*Military Implications:*

The report is a valuable source of information for: after-war environmental damage assessment; possible actions for remediation and mitigation; improved/green reconstruction after conflict; and legal aspects concerning possible compensations.

*Sources:*

Lebanon Rapid Environmental Assessment for Greening Recovery, Reconstruction & Reform—2006

- announcement: <http://www.un.org.lb/UN/details.asp?id=167>

- the report: <http://www.undp.org.lb/events/DraftReport.pdf>

### **Environmental Change and Security 12th Annual Report—Focus on Africa**

*Military Implications:*

Those military and civilian personnel with international environmental responsibilities should review the report.

*Source:*

ECSP Report 12

[http://www.wilsoncenter.org/index.cfm?topic\\_id=1413&fuseaction=topics.publications&group\\_id=240703](http://www.wilsoncenter.org/index.cfm?topic_id=1413&fuseaction=topics.publications&group_id=240703)

### **Environment and Security Initiative Progress Report 2006**

*Military Implications:*

Relevant military personnel working on security issues in the sub-regions highlighted in the ENVSEC report might consider consulting the report for eventual inputs to future reports on areas of concern, as well as noting success stories and considering their possible emulation.

*Source:*

The Environment and Security Initiative—An international partnership for managing conflict and risk

<http://www.envsec.org/docs/ENVSEC%20Progress%20Report%202006.pdf>

## **Japanese Chemical Weapons Cleaning in China Yet to be Completed**

### Japanese Supreme Court Denies Chinese Wartime Claims

#### *Military Implications:*

[Similar to previous on same issues] This is one more event that builds the case for an agreement for universal and ethical treatment of health damages induced by the use of chemical, biological or radiological weapons. The military should consider collaboration with diplomatic personnel on drafting provisions in anticipation of an agreement, and continue developing antidotes for such weapons.

#### *Sources:*

Japan rules against war claims

[http://news.yahoo.com/s/ap/20070510/ap\\_on\\_re\\_as/japan\\_china\\_germ\\_warfare\\_2](http://news.yahoo.com/s/ap/20070510/ap_on_re_as/japan_china_germ_warfare_2) (article available for a limited time on the website)

Japanese chemical bomb unearthed in north China

[http://english.people.com.cn/200706/15/eng20070615\\_384705.html](http://english.people.com.cn/200706/15/eng20070615_384705.html) (article available for a limited time on the website)

Japan rules against war claims

<http://www.guardian.co.uk/worldlatest/story/0,,-6622616,00.html> (article available for a limited time on the website)

## **NATIONAL/REGIONAL ENVIRONMENTAL STRATEGIES AFFECTING MILITARY ACTIVITIES**

## **Pan-African Parliament Upgrades Environmental Policy**

#### *Military Implications:*

Military liaisons in the African region should be told about the Army Strategy on the Environment and be requested to seek areas of cooperation in response to the new PAP emphasis on the environment.

#### *Sources:*

PAP Concludes Seventh Ordinary Session

[http://www.pan-africanparliament.org/DocumentsResources\\_DisplayDocument.aspx?Type=Docs&ID=285](http://www.pan-africanparliament.org/DocumentsResources_DisplayDocument.aspx?Type=Docs&ID=285)

PAP Considers Committee Reports

<http://www.pan-africanparliament.org/News.aspx?ID=229> (link works randomly)

‘United States of Africa’ in doubt

<http://www.sundaytimes.co.za/News/Article.aspx?id=463554>

South Africa: AU Chair Attends Pan African Parliament

<http://allafrica.com/stories/200705070262.html>

African Parliament blames west for environmental mess

[http://www.mg.co.za/articlepage.aspx?area=/breaking\\_news/breaking\\_news\\_africa/&articleid=308357](http://www.mg.co.za/articlepage.aspx?area=/breaking_news/breaking_news_africa/&articleid=308357)

## **Argentina Redeploys Military to Defend Water and Oil**

### *Military Implications:*

In addition to recognizing the increased role natural resources are playing in possible conflicts, Argentina's "Plan 2025" might establish new protected or controlled areas that are important for planning future international actions in Argentina.

### *Sources:*

Argentina's New War Doctrine for Resources

<http://visionesalternativas.com/article.asp?ID=%7bA7C2A077-ED2E-4B52-B75B-AEAE8AA0713F%7d%29&language=EN> (by subscription only)

The Ugly American Environmentalist

<http://www.time.com/time/world/article/0,8599,1595221,00.html>

Eco-millionaire's land grab prompts fury

<http://www.guardian.co.uk/argentina/story/0,,2005494,00.html>

## **European Temporary Committee on Climate Change to Begin Operations in May**

### *Military Implications:*

The military should follow the developments and proposals of the new committee for eventual implications for new environmental regulations, standards, or policies, and consequently emerging strategies, to help anticipate new requirements that might affect military operations.

### *Sources:*

Commissioner Dimas welcomes European Parliament decision to set up temporary committee on climate change

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/568&format=HTML&aged=0&language=EN&guiLanguage=en>

Stavros Dimas. Member of European Commission, responsible for environment Climate change and sustainable use of energy ASEM Environment Minister's meeting Copenhagen, 25 April 2007

<http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/07/250&format=HTML&aged=0&language=EN&guiLanguage=en>

## **U.S. Created Committee to Address Climate Change and Energy Security Issues**

### **Sustainable Development Strategies**

### *Military Implications:*

The military should follow the developments of these proposals that might result in new environmental regulations and new standards policies, and consequently emerging strategies, to ensure that military activities comply with the new requirements.

### *Sources:*

Pelosi Announces Members of Select Committee on Energy Independence and Global Warming

<http://speaker.gov/newsroom/pressreleases?id=0091>

Pelosi on House Vote to Create Select Committee on Energy Independence and Global Warming

<http://speaker.gov/newsroom/pressreleases?id=0090>

Environmental Poll: March 2007

<http://www.yale.edu/envirocenter/environmentalpoll.htm>

Polling the People (interview with Dan Esty)

<http://www.loe.org/shows/shows.htm?programID=07-P13-00011#feature6>

## **Sustainable Development Strategies**

### *Military Implications:*

The military should follow the developments of these proposals that might result in new environmental regulations and new standards policies, and consequently emerging strategies, to ensure that military activities comply with the new requirements.

### *Sources:*

Global talks on new climate deal must start now, commissioner says

<http://euobserver.com/9/23797/?rk=1>

Intergovernmental Preparatory Meeting (26 Feb - 2 Mar 2007)

[http://www.un.org/esa/sustdev/csd/csd15/csd15\\_ipm.htm](http://www.un.org/esa/sustdev/csd/csd15/csd15_ipm.htm)

Summary of the Intergovernmental Preparatory Meeting for the Fifteenth Session of the Commission on Sustainable Development

<http://www.iisd.ca/vol05/enb05243e.html>

Climate change conference of key nations achieves ‘important progress’ – UN official

<http://www.un.org/apps/news/story.asp?NewsID=21929&Cr=&Cr1=>

G8 climate consensus emerging, U.S. odd man out

[http://thestar.com.my/news/story.asp?file=/2007/3/18/worldupdates/2007-03-17T215237Z\\_01\\_NOOTR\\_RTRJONC\\_0\\_-291368-2&sec=Worldupdates](http://thestar.com.my/news/story.asp?file=/2007/3/18/worldupdates/2007-03-17T215237Z_01_NOOTR_RTRJONC_0_-291368-2&sec=Worldupdates)

## **EU and US to Cooperate on Environmental Research**

### *Military Implications:*

This is an opportunity to review military-environmental issues between the US and the EU to identify what could be areas for military participation in the collaborative research envisioned by this new agreement. Additionally, a review of the 7th EU Research Framework Programme at <http://www.cordis.europa.eu/fp7> would provide background on some EU interests.

### *Sources:*

EU and US agree to cooperate on environmental research and ecoinformatics

<http://www.ec.europa.eu/research/press/2007/pr0902-2en.cfm>

EU and US agree to cooperate on environmental research of nanotechnology impacts

<http://www.nanowerk.com/news/newsid=1427.php>

## **Asia-Pacific Should Intensify Green Growth Efforts**

### *Military Implications:*

Military personnel with environmental security responsibilities in the Asian region should review the document for potential new regulations, areas for cooperation, and opportunities for military-to-military training and assistance.

### *Sources:*

State of the Environment in Asia and the Pacific 2005

<http://www.unescap.org/esd/environment/soe/2005>

UNESCAP Report: Asia-Pacific Environment at Boiling Point

<http://www.unescap.org/unis/press/2006/dec/g61.asp>

## **China Calls for Enhanced Cooperation on Environmental Protection in Northeast Asia**

### *Military Implications:*

Environment protection, especially management of air pollution at the regional level, can serve as a platform for stable and long-term cooperation in a region where political and historical issues often hamper communication among countries. Military personnel should monitor activity in regional cooperation on environmental issues. Progress could help improve regional (traditional) security. The monitoring would position the US military to assist through North-East Asian partners and allies.

### *Sources:*

North-East Asia Sub-regional Program for Environmental Cooperation

<http://www.neaspec.org/index.asp>

Address by Mr. Cui Tiankai

<http://www.fmprc.gov.cn/eng/zxxx/t305589.htm>

## **The Disputes over the Northern Territories Set to Continue**

### *Military Implications:*

It is likely that discussions for clear international regulations concerning the Arctic region will increase rapidly, and more military action will be called for to ensure the safety of individuals and ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations in developing timely, adequate national and international regulations and enforcement procedures regarding the Arctic.

### *Source:*

Putin's Arctic invasion: Russia lays claim to the North Pole - and all its gas, oil, and diamonds

[http://www.dailymail.co.uk/pages/live/articles/news/worldnews.html?in\\_article\\_id=464921&in\\_page\\_id=1811](http://www.dailymail.co.uk/pages/live/articles/news/worldnews.html?in_article_id=464921&in_page_id=1811)

## **New Canadian Strategies for Monitoring the Northwest Passage**

### *Military Implications:*

It is likely that discussions for clear international regulations concerning Northwest Passage navigation will increase rapidly and more military action will be called for to ensure the safety of individuals and ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations in developing adequate national and international regulations and enforcement procedures regarding the Arctic region. By exercising sovereignty, Canada could regulate future shipping through the passage and impose its own rules for the Northwest Passage, including the right to require vessels to conform to certain environmental and construction standards to avoid disasters in this ecologically fragile region.

### *Source:*

Northwest Passage 'could open in 2015'

<http://www.canada.com/vancouver/news/story.html?id=a2af425d-74ca-4f49-963b-9795fed6d754&k=8211>

## **China's Climate Change and S&T Action Plan**

### *Military Implications*

This is another opportunity to explore ways of applying the Army's Strategy on the Environment internationally. Military representatives in China should contact their counterparts to exchange ideas on how the military cooperation can contribute in environmentally oriented science and technology activities.

*Sources:*

China's National Climate Change Programme

<http://en.ndrc.gov.cn/newsrelease/P020070604561191006823.pdf>

S&T to underpin China's climate activities

<http://www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=3687&language=1>

China Struggling to Control Urban Pollution

[http://english.sepa.gov.cn/zwxx/hjyw/200706/t20070612\\_105064.htm](http://english.sepa.gov.cn/zwxx/hjyw/200706/t20070612_105064.htm)

China now no. 1 in CO2 emissions; USA in second position

<http://www.mnp.nl/en/dossiers/Climatechange/moreinfo/Chinanowno1inCO2emissionsUSAinsecondposition.html>

### **China to Invest \$175 Billion in Environmental Protection over Five Years**

*Military Implications:*

This decision may also result in China becoming a more active and positive influence in international environmental protection efforts. Military liaisons in Beijing might consider contacting the State Environmental Protection Administration to offer advice and assistance, especially on the military's role in environmental security.

*Sources:*

China to Invest US\$175 Billion in Environment Clean-Up

<http://www.planetark.com/dailynewsstory.cfm/newsid/37328/story.htm>

China's growing air pollution reaches American skies

<http://www.statesman.com/news/content/news/stories/nation/08/5chinapollution.html>

### **China Creates 11 Independent Environmental "Watchdog" Centers**

*Military implications:*

These new centers could provide early warning of environmental security changes in China.

*Source:*

New environment watchdogs freed from local govt meddling

[http://news.xinhuanet.com/english/2006-07/31/content\\_4901813.htm](http://news.xinhuanet.com/english/2006-07/31/content_4901813.htm)

### **Ecuador Gets an Environmentalist Foreign Minister**

*Military Implications:*

Military personnel in Quito involved in possible military-to-military contacts with the Ecuadorian forces might be able to use this appointment to aid in approaching them about discussions on the military's role in environmental security. For example, if the U.S. military is involved in the spraying of drug crops, new efforts could reduce the environmental impacts on the border area. And, the U.S. military could be a mediating agent between Colombia and Ecuador.

*Source:*

Environmentalist Named Ecuador Foreign Minister

<http://www.planetark.com/dailynewsstory.cfm/newsid/39473/story.htm>



## **TECHNOLOGICAL BREAKTHROUGHS WITH ENVIRONMENTAL SECURITY IMPLICATIONS**

### **Computer Technology and Robotics**

#### **UNEP and Google Earth to Pinpoint Environmental Hotspots**

##### *Military implications:*

The military should create procedures to review what parts of its more advanced means and images of earth observation and ground-truthing can be shared on an ongoing basis to continually improve the Atlas of our Changing Environment. It should also seek ways in which this new tool could help prevent environment-related conflicts. As precision improves, environmental damages caused by conflicts could be made more defined and available, increasing accountability and responsibility for military actions.

##### *Sources:*

Flying Around the Globe on a Time Machine

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=487&ArticleID=5350&l=en>

### **New Detection and Cleanup Techniques**

#### **FAO/IAEA Meeting Discusses Portable Disease Detection Devices**

##### *Military Implications:*

Relevant military personnel should contact the FAO/IAEA Programme and obtain information on the techniques and devices presented at the meeting, so that they can be evaluated for possible use in environmental surveillance systems for human and animal disease detection.

##### *Source:*

Portable lab could revolutionize bird flu detection

<http://www.fao.org/newsroom/en/news/2007/1000517/index.html>

#### **Portable Mass Spectrometer and Gas Chromatograph**

##### *Military Implications:*

Such testing units would be indispensable to military, local authorities, and civilian companies in conflict and post-conflict areas, or regions under threat. The military should consider following and supporting the research and have the instruments available as soon as possible for its own use and distribution to other organizations in affected regions.

##### *Source:*

BYU Scientists Create Portable Spectrometer

<http://newsnet.byu.edu/story.cfm/63705>

#### **Nanotech-based Explosives Detector**

##### *Military Implications:*

The military should explore this technology for explosives detection, post-conflict clean up and other environmental monitoring usage. This information could also be forwarded to the Transportation Safety Agency, in case they are, as yet, unaware of the development.

*Source:*

Portable, cheap and fast explosives detector built with nanotechnology

<http://www.nanowerk.com/spotlight/spotid=1138.php>

### **Detector Materials for Cyanogen Halides from Chemical Weapons**

*Military Implications:*

The military should investigate the possible applications of these materials for explosives detection and in environmental monitoring systems.

*Source:*

Out of the dark. Highly sensitive chemosensors for cyanogen halides. 14 December 2006

<http://www.nature.com/materials/news/news/061214/portal/m061214-1.html> (by subscription only)

### **New Spectroscopy Technique Speeds Up Virus Detection**

*Military Implications:*

The military should follow this development for potential improved environmental biological weapons surveillance systems.

*Source:*

Researchers use laser, nanotechnology to rapidly detect viruses

<http://www.physorg.com/news82816307.html>

### **Nanofibrils Film Improves Explosives Sensing Performance**

*Military Implications*

The military should follow up on this development for its possible application to environmental surveillance, range clearing, and battlefield cleanup.

*Source:*

U.S. and Chinese scientists have created a type of fluorescent sensing material that could lead to rapid detection of explosives in security screening

<http://www.physorg.com/news99672192.html>

### **Bacterial Proteins Help Nanoparticle Cleanup**

*Military Implications:*

The military should follow this work in order to evaluate the possible use of this technology in environmental cleanup operations.

*Source:*

Microbes at work cleaning up the environment

[http://www.llnl.gov/pao/news/news\\_releases/2007/NR-07-06-07.html](http://www.llnl.gov/pao/news/news_releases/2007/NR-07-06-07.html)

### **New Material Has High Absorbency for Organic Solvents**

*Military Implications:*

The military should investigate this development for possible use in industrial and maintenance spill remediation and post-conflict cleanup.

*Source:*

Kyushu University developed new material, which can absorb large amount of organic solvent such as chloroform. Japan Chemical Information of May/2007

### **New Production Technique for Nanofiber Filters for Chemical Warfare Protection**

*Military Implications:*

The military should follow this development and its applicability to protect the personnel exposed to a chemically hazardous environment. The materials might also be useful for protecting hazardous material and wastes handlers.

*Source:*

Nanofilter suit for chemical warfare

<http://www.hindu.com/seta/2006/10/12/stories/2006101200611500.htm>

### **Sugar-coated Nanotubes Stop Anthrax Inhalation**

*Military Implications:*

If not already done so, the military should follow this development for eventual field applicability.

*Source:*

Clemson Researchers Develop Nanotechnology to Stop Weaponized Anthrax in Its Tracks

[http://clemsonews.clemson.edu/WWW\\_releases/2006/October/anthrax.html](http://clemsonews.clemson.edu/WWW_releases/2006/October/anthrax.html)

### **New Spectroscopy Sensor for Environmental Monitoring**

*Military Implications:*

The military should investigate the incorporation of this new technology into environmental surveillance and scanning systems.

*Source:*

UW Invention Targets Terrorist Weapons

<http://www.physorg.com/news75561848.html>

### **Nanocantilevers for Ultra-small Sensors**

*Military Implications:*

There are a wide range of applications of such sensors from protecting against food poisoning to detecting viruses, bacteria and other pathogens in the environment.

*Sources:*

'Nanocantilevers' yield surprises critical for designing new detectors

<http://www.purdue.edu/UNS/html4ever/2006/060828.Bashir.nanocant.html>

Anomalous resonance in a nanomechanical biosensor

<http://www.pnas.org/cgi/content/abstract/0602022103v1>

## **Biosensors Sniff out TNT and Possibly Other Dangers**

### *Military Implications:*

The military should follow such developments as possibly suitable for handheld or remote unattended use.

### *Source:*

Biosensor Sniffs Out Explosives

<http://www.sciencedaily.com/releases/2007/05/070508185845.htm>

Device makes quick work of suspected toxins

[http://www.pittsburghlive.com/x/pittsburghtrib/business/s\\_507097.html](http://www.pittsburghlive.com/x/pittsburghtrib/business/s_507097.html)

## **Digital Magnetofluidics Improves Biochemical Analysis**

### **Reliable Anthrax Antibodies Developed**

### **Bar-coded Nanowires May Yield Small, Fast Bio Detectors**

### **New Low-cost System for Bacteria Identification**

### **Quantum Dot Device Provides Fast Detector for DNA Sequences**

### **Sensicore's Lab on a Chip Water Profiler Automates Lab Functions**

### *Military Implications:*

Those relevant military personnel with responsibilities for environmental surveillance, who are not already informed of these, should be made aware of these developments for potential applications.

### *Sources:*

Magnetism and mimicry of nature hold hope for better medicine, environmental safety

<http://www.physorg.com/news72620450.html>

Anthrax Detector Developed

<http://www.physorg.com/news74967063.html>

Nanowires built to fight bioterrorism

[http://articles.techrepublic.com.com/2100-1009\\_11-6103410.html](http://articles.techrepublic.com.com/2100-1009_11-6103410.html)

Purdue creates new low-cost system to detect bacteria

<http://www.physorg.com/news73231402.html>

Digital DNA detector spots single molecules

<http://www.newscientisttech.com/article/dn9744-digital-dna-detector-spots-single-molecules.html>

Kahn, M. Sensicore's Lab on a Chip Water Profiler Automates Lab Functions, tech talk, G. Miner, ed., Journal of the American Water Works Association, July, 2006, 98(7), 46-48. (by subscription only)

## **Deep Cooling Improves Uranium Detection**

### *Military Implications:*

This technique should be studied for its feasibility for locating post-conflict areas needing cleanup of uranium contamination and managing the cleanup and disposal processes.

### *Source:*

Cold Shot

<http://www.physorg.com/news77290661.html>

### **Biodetecting Wipes**

#### *Military Implications:*

The military should follow this development as it progresses toward practical application and, when it is available, consider its application to detection and cleanup of contaminated environments.

#### *Source:*

Biodegradable napkin could quickly detect biohazards

<http://www.physorg.com/news77201571.htm>

### **Fish Provide Early Warning of Toxic Chemicals**

#### *Military Implications:*

The military should investigate this development for its applicability to environmental water supply monitoring, especially in a post-conflict areas, where chemical pollution might be taking place.

#### *Source:*

Fish Used to Detect Terror Attacks

<http://www.enn.com/today.html?id=11282>

### **Ultrasound Soil Cleanup Technique**

#### *Military Implications:*

A scaled down and portable version of this system might have good field applicability for post-conflict and installation cleanup.

#### *Source:*

Treating toxic waste with sound waves

<http://www.csiro.au/csiro/content/standard/ps9b,..html>

### **New Surface Decontamination Method**

#### *Military Implications:*

The military should consider investigating this technique for its usefulness in accident and post-conflict cleanup.

#### *Sources:*

Electro-Decontamination Of Contaminated Surfaces (WO/2007/001263)

<http://www.wipo.int/pctdb/en/ia.jsp?IA=US2005/021455&LANGUAGE=EN>

Wrap radiation in rubber

<http://www.newscientisttech.com/article/dn10874?DCMP=NLC-nletter&nsref=dn10874> (see 3-rd article)

### **Virus Detection Technique—Fast, Convenient, and Sensitive**

#### *Military Implications:*

The military should follow up on this research to explore its applicability to field virus detection systems.

#### *Source:*

Virus detection encounters some useful interference

<http://www.nature.com/materials/nanozone/news/070111/portal/m070111-3.html> (free registration required)

## **New Technique for DNA Isolation**

### *Military Implications:*

The military should investigate this technique for its applicability as a front end for fieldable DNA-based environment scanning systems, some of which have been described in previous environmental security reports.

### *Source:*

Step forward in micro/nanotechnology

[http://www.tno.nl/tno/actueel/tno\\_persberichten/2007/tno\\_ontwikkelt\\_generieke\\_index.xml](http://www.tno.nl/tno/actueel/tno_persberichten/2007/tno_ontwikkelt_generieke_index.xml)

## **Sensitive Uranium Detector Using DNA**

### *Military Implications:*

The military should investigate this new technique for its applicability to systems for environmental surveillance and post-conflict cleanup in situations in which uranium is a factor.

### *Sources:*

Disposable uranium ion detector developed

<http://www.physorg.com/news90609076.html>

A catalytic beacon sensor for uranium with parts-per-trillion sensitivity and millionfold selectivity

[http://www.pnas.org/cgi/content/abstract/104/7/2056?maxtoshow=&HITS=10&hits=10&RESU\\_LTFORMAT=&fulltext=uranium+DNA&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT](http://www.pnas.org/cgi/content/abstract/104/7/2056?maxtoshow=&HITS=10&hits=10&RESU_LTFORMAT=&fulltext=uranium+DNA&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT)

## **New and Improved Water Purification Method**

### *Military Implications:*

The military should investigate the application of this method to cleanup of post-conflict environments and force protection, as well as at permanent installations.

### *Source:*

New water-purification method promises radical improvement

<http://www.physorg.com/news70621194.html>

## **Space Technology**

### Space Technology for Environmental Security

### *Military Implications:*

[Same as previous on similar issues] Developing an integrated environmental monitoring capability to provide informed data to the public, and policy- and decision-makers, would considerably improve the assessment of potential environmental impacts of different actions, facilitate enforcement of international treaties worldwide, and could help mitigate environmental and social consequences induced by conflict or natural disasters. The military should consider full cooperation in all the phases—from development to implementation and use of space-based observation systems.

### *Sources:*

Satellites play vital role in understanding the carbon cycle

[http://www.esa.int/esaEO/SEMLEHMJC0F\\_planet\\_0.html](http://www.esa.int/esaEO/SEMLEHMJC0F_planet_0.html)



2007 ESA ENVISAT Symposium <http://www.envisat07.org/>  
Envisat Symposium 2007 kicks off in Switzerland  
[http://www.esa.int/esaEO/SEMNU9MJC0F\\_index\\_0.html](http://www.esa.int/esaEO/SEMNU9MJC0F_index_0.html)  
Satellites vital for environmental agreement  
[http://www.esa.int/SPECIALS/ESApod/SEM08DMJC0F\\_0.html](http://www.esa.int/SPECIALS/ESApod/SEM08DMJC0F_0.html)  
A high-level conference on Global Monitoring for Environment and Security  
<http://www.gmes.info/newsdetail+M5a32281b86a.0.html>  
EC has adopted the European Space Policy [http://ec.europa.eu/enterprise/space/index\\_en.html](http://ec.europa.eu/enterprise/space/index_en.html)

### Space-Based Services for Improving Emergency Response

#### *Military Implications:*

The military should inform and facilitate emergency units around the world cooperate with programs using space technology-based tools. The HEWS model can be emulated for a variety of situation from disaster relief to conflict and post-conflict intervention.

#### *Source:*

Faster and better emergency response through satellite telecoms  
[http://www.esa.int/esaTE/SEMZ00V681F\\_index\\_0.html](http://www.esa.int/esaTE/SEMZ00V681F_index_0.html)  
Bridging the Gap between Space and Local and Regional Users  
<http://www.eurisy.org/>  
A Giant Leap For Space Activities In Europe  
[http://www.spacemart.com/reports/A\\_Giant\\_Leap\\_For\\_Space\\_Activities\\_In\\_Europe\\_999.html](http://www.spacemart.com/reports/A_Giant_Leap_For_Space_Activities_In_Europe_999.html)  
Chinese space agency joins the International Charter 'Space and Major Disasters'  
[http://www.esa.int/esaEO/SEMCG59RR1F\\_environment\\_0.html](http://www.esa.int/esaEO/SEMCG59RR1F_environment_0.html)  
PAP Considers Committee Reports  
<http://www.pan-africanparliament.org/News.aspx?ID=229>  
Europe's Space Policy becomes a reality today  
[http://www.esa.int/esaCP/SEM4UU8RR1F\\_Benefits\\_0.html](http://www.esa.int/esaCP/SEM4UU8RR1F_Benefits_0.html)

### Technologies that Could Trigger New Forms of Arms Race

#### **Futuristic Nanotech and Synthetic Bioweapons Regulation**

#### *Military Implications:*

Military forecasters of such weapons should meet with diplomats to create an agenda to begin the process of creating treaties to better control such futuristic weapons and weapons systems and the effects of their residuals.

#### *Sources:*

Military nanotechnology - how worried should we be?  
<http://www.nanowerk.com/spotlight/spotid=1015.php>  
Israel to pursue nanotechnology weapons <http://www.foresight.org/nanodot/?p=2366>  
Israel developing bionic arsenal <http://www.smh.com.au/news/Technology/Israel-developing-bionic-arsenal/2006/11/18/1163266789754.html>

## **Promising Environmental-friendly Technologies**

### **Clean Green Hydrogen-Making Process**

#### *Military Implications:*

The new technology should be explored and eventually encouraged for future applicability in green (hydrogen) power, as well as for biomass recycling aspects.

#### *Source:*

Clean green hydrogen-making machine created. NewScientist.com, 03 November 2006  
[http://www.newscientisttech.com/article.ns?id=dn10441&feedId=energy-fuels\\_rss20](http://www.newscientisttech.com/article.ns?id=dn10441&feedId=energy-fuels_rss20)

### **New Generator Produces Hydrogen from Aluminum and Water**

#### *Military Implications*

The military should follow this development and its evaluation, to determine its possible application to simplify logistics for environmentally friendly fuels.

#### *Source:*

New process generates hydrogen from aluminum alloy to run engines, fuel cells  
<http://www.physorg.com/news98556080.html>

### **World Record solar cell efficiency achieved**

#### *Military Implications:*

Technological breakthrough like this could help the military significantly reduce its greenhouse gases emissions in the near future without increasing operating costs. The military should monitor the cost-effectiveness of such technologies and consider potential use and adaptation for military devices/equipment as the technologies become more competitive.

#### *Sources:*

New World Record Achieved in Solar Cell Technology

<http://www.energy.gov/news/4503.htm>

Solar cell breakthrough claimed

<http://www.planet2025news.net/ntext.rxml?id=3895&photo=>

Solar America Initiative website: [http://www1.eere.energy.gov/solar/solar\\_america/](http://www1.eere.energy.gov/solar/solar_america/)

### **Enzyme-based Biofuel Cells Using Nanotechnology**

#### *Military Implications:*

The military should consider following and encouraging such research for finding alternative fuel technologies to reduce environmental impacts.

#### *Source:*

Simple biofuel cells with nanotechnology

<http://www.nanowerk.com/news/newsid=1446.php>

Fructose/dioxygen biofuel cell based on direct electron transfer-type bioelectrocatalysis

<http://www.rsc.org/publishing/journals/CP/article.asp?doi=b617650j>

### **Photonic Crystal Provides 50% Cost Reduction**

#### *Military Implications:*

The military should investigate this development for its possible use in energy-saving systems for military applications.

#### *Source:*

Cheaper, More Efficient Solar Cells

<http://www.technologyreview.com/Energy/18415/>

### **Refrigerator Temperature Sensor Mod Saves Energy**

#### *Military Implications:*

The military should investigate whether and where this device could be installed to reduce energy consumption.

#### *Source:*

£25 fridge gadget that could slash greenhouse emissions

<http://environment.guardian.co.uk/climatechange/story/0,,2036183,00.html>

### **Printing Fuel Cells**

#### *Military Implications:*

The military should consider investigating how this versatile technology could be useful for creating microscale devices (e.g. to fabricate fuel cells for recharging communication or other devices used in field operations), and hence reduce greenhouse gas emissions and other pollution. The technology could be adaptable for biological and chemical analysis.

#### *Source:*

Printing Fuel Cells

[http://www.technologyreview.com/read\\_article.aspx?id=17626&ch=energy](http://www.technologyreview.com/read_article.aspx?id=17626&ch=energy)

### **Biologically Based Dyes Dramatically Lower Solar Cell Costs**

#### *Military Implications:*

The military should investigate this research for applications from roofing to portable systems.

#### *Source:*

Taking nature's cue for cheaper solar power

[http://masseynews.massey.ac.nz/2007/Press\\_Releases/04-04-07.html](http://masseynews.massey.ac.nz/2007/Press_Releases/04-04-07.html)

### **New Solar Cell/Battery Combination Saves Size and Weight**

#### *Military Implications:*

The military should investigate this research for applications in portable and self-sustaining energy units.

#### *Source:*

Gadget recharges itself -- shocking!

<http://www.thestar.com/sciencetech/article/203401>

### **Advanced Membrane Technology for Water Treatment to Counter Water Scarcity**

#### *Military Implications:*

Military developers should follow Australian progress in these research fields in order to make early use of any new technologies developed. Benefits could apply to force protection and military assistance in areas with water problems.

*Source:*

Advanced membrane technology for water treatment research

<http://www.csiro.au/science/ps321.html>

## **New Device to Suck CO2 from the Air**

*Military Implications:*

If this approach proves effective, then it could become an attractive carbon trade-off investment against military carbon-emitting activities, along with other approaches such as powdered iron in the ocean, tree plantings, and desert coastline seawater agriculture.

*Sources:*

First Successful Demonstration of Carbon Dioxide Air Capture Technology Achieved by Columbia University Scientist and Private Company

<http://www.earthinstitute.columbia.edu/news/2007/story04-24-07.php>

Giant carbon vacuums could cool Earth

<http://www.csmonitor.com/2007/0419/p13s01-sten.html>

## **Smog-Eating Materials**

*Military Implications:*

If the "smog-eating" products prove to be useful, the military should request its contractors to consider them in new buildings and infrastructure development.

*Source:*

Architecture in Italy goes green

<http://www.iht.com/articles/2006/11/22/news/smog.php>

## **China's ASAT Test Created Serious Long-Range Low-Earth Orbital Pollution**

*Military implications:*

Although military-to-military cooperation with China has been damaged by the ASAT test, it does offer an opportunity to explore joint research programs to reduce current space debris. In any case, the military should increase R&D to collect debris and improve modeling software to monitor and predict in greater detail, in addition to programs to harden satellites and space craft.

*Sources:*

Debris from China's Kinetic Energy ASAT Test

[http://www.ucsusa.org/global\\_security/space\\_weapons/debris-from-chinas-asat-test.html](http://www.ucsusa.org/global_security/space_weapons/debris-from-chinas-asat-test.html)

China's Anti-Satellite Test: Worrisome Debris Cloud Circles Earth

[http://www.space.com/news/070202\\_china\\_spacedebris.html](http://www.space.com/news/070202_china_spacedebris.html)

NASA Orbital Debris Program Office <http://orbitaldebris.jsc.nasa.gov>

Space debris spotlight [http://www.esa.int/esaCP/SEMHDJXJD1E\\_FeatureWeek\\_0.html](http://www.esa.int/esaCP/SEMHDJXJD1E_FeatureWeek_0.html)

United Nations Office for Outer Space Affairs (UNOOSA) <http://www.unoosa.org>

Inter-Agency Space Debris Coordination Committee <http://www.iadc-online.org>

## B. Preventing or Responding to Environmentally Caused Conflicts

### ENVIRONMENTAL CAUSES TRIGGERED MIGRATION

#### Climate Change Refugees

##### *Military Implications:*

[Same as previous on similar issues] The military should continue to reduce its environmental footprint, develop strategies to mitigate climate change effects, explore the military roles in addressing environmental refugee issues, and cooperate where possible with others to these ends.

##### *Sources:*

U.N. Professor Says Climate Change Is Creating New Refugees Who Deserve U.N. Protection

<http://www.enn.com/today.html?id=12788>

*Human tide: the real migration crisis*

<http://www.christian-aid.org.uk/indepth/705caweekreport/index.htm>

Climate change to force mass migration

<http://www.guardian.co.uk/international/story/0,,2078839,00.html>

The first refugees of global warming. Bangladesh watches in horror as much of the nation gives way to sea

<http://www.chicagotribune.com/news/nationworld/chi-0705010817may02,1,7033000.story?coll=chi-newsnationworld-hed&ctrack=1&cset=true> (free registration required; full text in this [Appendix](#))

Sessions of the Subsidiary Bodies, 7-18 May 2007, Bonn, Germany

<http://unfccc.int/meetings/sb26/items/3919.php>

UN meeting in Bonn moves world closer to action on climate change

<http://www.un.org/apps/news/story.asp?NewsID=22595&Cr=climate&Cr1=change>

#### Conference on Desertification Calls for Policies to Address Environmental Refugees

##### *Military Implications:*

Those developing military programs to prevent environmentally induced conflicts should follow the outcomes of such meetings and cooperate with other militaries, international agencies, and NGOs to create new policies and strategies to counter desertification and help cope with its consequences.

##### *Sources:*

Joint International Conference—Desertification and the International Policy Imperative

<http://www.inweh.unu.edu/inweh/drylands/IYDD.htm>

Experts Advise World Policies to Cope with Causes, Rising Consequences of Creeping Desertification

[http://www.inweh.unu.edu/inweh/drylands/Algiers\\_news\\_release-Final.pdf](http://www.inweh.unu.edu/inweh/drylands/Algiers_news_release-Final.pdf)

Forced migration key issue at desert meeting

<http://allafrica.com/stories/200612150974.html>

Looming desertification could spawn millions of environmental refugees

<http://news.mongabay.com/2006/1214-unu.html>

Droughts to set off exodus

<http://www.thestar.com/article/151381>

Rising Sea Levels Claim First Inhabited Island and Threaten Coastal Populations Worldwide  
Increasing Weather Extremes and Environmental Refugees due to Climate Change  
Coastline Erosion due to Rising Sea Waters Signaled Around the World  
Economic and Security Implications of Climate Change  
Developing Countries Most Affected by Global Warming

*Military Implications:*

Extreme weather conditions, threats to food supply, and loss of livelihood (mostly in highly populated regions such as India and China) might increase unrest and threaten global stability. The U.S. Army Corps of Engineers—having the logistics and know-how—should consider worldwide collaboration with counterparts and international organizations (e.g. the UNU Institute for Environment and Human Security in Bonn) to determine priorities on which communities need what kind of help from a network of state and international agencies. Also, the issue of environmental refugees should be tackled swiftly to avoid conflicts that this rising segment of world population might cause.

*Sources:*

Disappearing world: Global warming claims tropical island  
<http://news.independent.co.uk/environment/article2099971.ece>

Rising sea levels engulfing Indian world heritage islands  
<http://www.terradaily.com/2006/061221015453.078uvrt9.html>

The last tide could come at any time. Then these islands at the end of the Earth will simply vanish

<http://www.timesonline.co.uk/article/0,,3-2513189,00.html>

In many villages, Alaskans face physical and cultural erosion  
<http://www.signonsandiego.com/news/nation/20061225-0916-alaskaerosion.html>

Oceans May Rise up to 140 cms by 2100 Due to Warming  
<http://www.planetark.com/dailynewsstory.cfm/newsid/39504/story.htm>

London-on-Sea: the future of a city in decay. By Roger Highfield, Telegraph.co.uk, 27/12/2006  
<http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2006/12/27/nlondon27.xml>

INTERVIEW - Refugees, Disease Big Risk from Global Warming – UN  
<http://www.planetark.com/dailynewsstory.cfm/newsid/38588/story.htm>

Climate water threat to millions  
<http://news.bbc.co.uk/2/hi/science/nature/6068348.stm>

*Feeling the Heat*, report by Tearfund, member of the Disasters Emergency Committee  
<http://www.tearfund.org/webdocs/Website/News/Feeling%20the%20Heat%20Tearfund%20report.pdf>

Expect a Warmer, Wetter World this Century, Computer Models Agree  
<http://www.ucar.edu/news/releases/2006/wetterworld.shtml>

Global Warming Could Spread Extreme Drought  
<http://www.ens-newswire.com/ens/oct2006/2006-10-05-01.asp>

The ocean is slowly claiming Malasiga. They say it's global warming  
<http://www.chicagotribune.com/news/nationworld/chi-0608200380aug20,1,3457454.print.story?ctrack=1&cset=true> (by free subscription only)

Britain is falling into the sea (or bits of it, anyway)  
<http://www.canada.com/montrealgazette/news/insight/story.html?id=f3247666-19da-4a02-9c8e-ea2fe464b728> (article available free for a limited time)

Ocean acidification: the other CO<sub>2</sub> problem  
<http://www.newscientist.com/channel/earth/mg19125631.200> (by subscription only)



Tackle climate change or face deep recession, world's leaders warned

<http://www.guardian.co.uk/frontpage/story/0,,1931685,00.html>

Preparation Environment Council, 23 October 2006

<http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/06/389&format=HTML&aged=0&language=EN&guiLanguage=en>

Stern Review sets out economic imperative of climate change

[http://www.wwf.org.uk/news/n\\_0000003037.asp](http://www.wwf.org.uk/news/n_0000003037.asp)

£3.68 trillion: The price of failing to act on climate change

[http://observer.guardian.co.uk/uk\\_news/story/0,,1934381,00.html](http://observer.guardian.co.uk/uk_news/story/0,,1934381,00.html)

British government report: global warming will devastate world economy

[http://ca.news.yahoo.com/s/capress/britain\\_global\\_warming](http://ca.news.yahoo.com/s/capress/britain_global_warming)

Climate inaction 'has high cost'

<http://news.bbc.co.uk/2/hi/science/nature/5398784.stm>

Dangerous climate change is hitting Africa hard say top aid and environment groups

<http://www.neweconomics.org/gen/africaupinsmoke.aspx>

Africa—Up in Smoke 2. The second report on Africa and global warming from the Working Group on Climate Change and Development

[http://www.neweconomics.org/gen/z\\_sys\\_PublicationDetail.aspx?pid=232](http://www.neweconomics.org/gen/z_sys_PublicationDetail.aspx?pid=232)

Merkel to Target Climate Change as G8, EU Leader

<http://www.dw-world.de/dw/article/0,2144,2188336,00.html>

Rising sea forces islanders to relocate

<http://www.earthsky.org/shows/show.php?date=20060814>

Global warming: Devastation of an atoll

<http://news.independent.co.uk/environment/article1222595.ece> (article available free for a limited time)

World Bank: Climate threatening programs

[http://www.businessweek.com/ap/financialnews/D8JQ7VIG1.htm?sub=apn\\_home\\_up%26chan=db](http://www.businessweek.com/ap/financialnews/D8JQ7VIG1.htm?sub=apn_home_up%26chan=db)  
(article available free for a limited time)

Development Under Climate Threat

<http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21035991~pagePK:34370~piPK:34424~theSitePK:4607,00.html>

Global warming is more than just a green issue, says Secretary-General

<http://www.un.org/apps/news/story.asp?NewsID=20091&Cr=climate&Cr1=change>

The ocean is slowly claiming Malasiga. They say it's global warming

<http://www.chicagotribune.com/news/nationworld/chi-0608200380aug20,1,3457454,print.story?ctrack=1&cset=true> (by free subscription only)

Britain is falling into the sea (or bits of it, anyway)

<http://www.canada.com/montrealgazette/news/insight/story.html?id=f3247666-19da-4a02-9c8e-ea2fe464b728> (article available free for a limited time)

Ocean acidification: the other CO<sub>2</sub> problem

<http://www.newscientist.com/channel/earth/mg19125631.200> (by subscription only)

## **Population and Resources Affecting the Risk of Conflict**

*Military implications:*

The military should consider some of the recommendations such as: performing more research on youth bulges and political stability; age composition and exclusion in urban centers; micro-level studies of rebel recruitment; and youth bulges in post-conflict settings.

*Sources:*

New Population Projections Underline Urgency of Family Planning Needs in Developing Nations

<http://www.unfpa.org/news/news.cfm?ID=943>

World population may reach 9.2 billion by 2050

<http://www.msnbc.msn.com/id/17605186/>

Demography and Conflict: How Population Pressure and Youth Bulges Affect the Risk of Civil War

[http://www.wilsoncenter.org/index.cfm?fuseaction=events.event&event\\_id=219250](http://www.wilsoncenter.org/index.cfm?fuseaction=events.event&event_id=219250)

Climate-Security Connections: An Empirical Approach to Risk Assessment

[http://www.wilsoncenter.org/index.cfm?fuseaction=events.event&event\\_id=219458#](http://www.wilsoncenter.org/index.cfm?fuseaction=events.event&event_id=219458#)

## **FOOD AND FRESHWATER**

### ***Living Planet Report 2006***

*Military Implications:*

This report should be studied by those with responsibilities for implementing the Army's Strategy for the Environment. This report is another addition in the long series warning on humanity's unsustainable practices. It is expected that pressure to improve performance will increase mostly on the countries that top the ecological footprint list.

*Sources:*

Living Planet Report 2006 outlines scenarios for humanity's future

[http://www.footprintnetwork.org/newsletters/gfn\\_blast\\_0610.html](http://www.footprintnetwork.org/newsletters/gfn_blast_0610.html)

"Living Planet Report 2006"

[http://www.ourplanet.com/imgversn/footprint/living\\_planet\\_report.html](http://www.ourplanet.com/imgversn/footprint/living_planet_report.html)

### **Unless Water Management Improves, Conflicts over Water Are Inevitable**

*Military Implications:*

These findings should be used to argue for increased military attention to how it can prevent water-related conflicts. Key military water and/or corruption experts should join the Water Integrity Network.

*Sources:*

World Water Week in Stockholm; 20-26 August, 2006

<http://www.worldwaterweek.org/>

Business in the world of water

<http://www.wbcsd.org/DocRoot/OpBmbDCToPi3uCskR9Ie/h20-scenarios.pdf>

Cost of water shortage: civil unrest, mass migration and economic collapse

<http://www.guardian.co.uk/water/story/0,1851712,00.html>

WBCSD Floats Water Scenarios Project

[http://www.greenbiz.com/news/news\\_third.cfm?NewsID=33576&CFID=13072466&CFTOKEN=61764226](http://www.greenbiz.com/news/news_third.cfm?NewsID=33576&CFID=13072466&CFTOKEN=61764226)

Report: Water crisis hits rich countries

[http://www.panda.org/news\\_facts/newsroom/index.cfm?uNewsID=77900](http://www.panda.org/news_facts/newsroom/index.cfm?uNewsID=77900)

New Alliance Seeks to Fight Water Sector Corruption

<http://www.enn.com/today.html?id=11110>

"Asia's Coming Water Wars"

[http://www.pinr.com/report.php?ac=view\\_report&report\\_id=545&language\\_id=1](http://www.pinr.com/report.php?ac=view_report&report_id=545&language_id=1)

Water, water everywhere?

[http://www.economist.com/agenda/displaystory.cfm?story\\_id=7815561&fsrc=nwl](http://www.economist.com/agenda/displaystory.cfm?story_id=7815561&fsrc=nwl) (by subscription only; see full text further in this [Appendix](#))

A Third of the World Population Faces Water Scarcity Today

[http://www.iwmi.cgiar.org/Press/releases/CA%20Launch%20Press%20Release\\_Final.pdf](http://www.iwmi.cgiar.org/Press/releases/CA%20Launch%20Press%20Release_Final.pdf)

"A Thirsty World", Eds. Yeston, Coontz, Smith & Ash, SCIENCE, 313, 25 Aug 2006, pp 1067-1090. (by subscription only)

## **Water Scarcity**

### *Military Implications:*

The military should intensify efforts to improve and accelerate dialogue and cooperation for an international water management system and the design of an international adaptation and mitigation strategy addressing increased water scarcity and its effects.

### *Sources:*

World Water Day 2007 <http://www.unwater.org/wwd07/flashindex.html>

Going nowhere fast: Top rivers face mounting threats

[http://www.panda.org/news\\_facts/newsroom/index.cfm?uNewsID=96520](http://www.panda.org/news_facts/newsroom/index.cfm?uNewsID=96520)

Climate Report Warns of Drought, Disease <http://www.physorg.com/news92763803.html>

Peru's alarming water truth <http://news.bbc.co.uk/1/hi/world/americas/6412351.stm>

Polluted air 'triggering drought' in northern China

<http://www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=3469&language=1>

## **OSCE Environmental Security Conference Focuses on Land and Water**

### *Military Implications:*

Plans to conduct U.S. military training and operate facilities in Eastern Europe could be affected by future policies growing from these discussions. BG (R). Christopher King, Ph.D., P.E., Dean of Academics, U.S. Army Command and General Staff College, led the first panel, speaking about: Concepts of Strategic Environmental Security. Military personnel with related responsibilities should e-mail Dr. King at <Wendell.c.king@leavenworth.army.mil> for his paper and assessment of the conference.

### *Source:*

OSCE Economic and Environmental Forum. Part 1 / Vienna, 22 - 23 January 2007. "Key challenges to ensure environmental security and sustainable development"

[http://194.8.63.155/documents/eea/2007/01/22718\\_en.pdf](http://194.8.63.155/documents/eea/2007/01/22718_en.pdf)

## **Proposal for Recognizing Water as a Basic Human Right**

### *Military Implications:*

[Similar to previous on the same issue] Military personnel who assess potential conflicts related to water and other water management issues should review the outcomes of the meeting for implications for their plans and collaboration opportunities for reducing water problems internationally. The militaries of leading countries should develop a panel on the role of the militaries around the world in solving water problems.

*Sources:*

First meeting of the Parties (Geneva, 17-19 January 2007)

[http://www.unece.org/env/water/meetings/documents\\_MoPPWH.htm](http://www.unece.org/env/water/meetings/documents_MoPPWH.htm)

Protocol on Water and Health

[http://www.unece.org/env/water/text/text\\_protocol.htm](http://www.unece.org/env/water/text/text_protocol.htm)

European ECO-Forum Newsletter No. 16, January 2007

### ***Global Risk 2007, the World Economic Forum***

*Military Implications:*

The military should review the report for insights on potential security implications of these non-traditional risks mainly in already fragile regions.

*Sources:*

Global Risks 2007; A Global Risk Network Report

[http://www.weforum.org/pdf/CSI/Global\\_Risks\\_2007.pdf](http://www.weforum.org/pdf/CSI/Global_Risks_2007.pdf)

Global Risk Network: Mapping solutions to the greatest risks

<http://www.weforum.org/en/initiatives/globalrisk/index.htm>

### ***State of the World 2007: Our Urban Future***

*Military Implications:*

The report is a source of information on the implications of urbanization, trends, and possible future developments. It should prove helpful in understanding future situations related to human security; and thus aid planning improvement, resource prioritization and preparedness action.

*Source:*

State of the World 2007: Our Urban Future

<http://www.worldwatch.org/node/4839>

### ***GEO Year Book 2007***

*Military Implications:*

The GEO reports are a valuable source of information on the global state of the environment and trends in future international policy aspects.

*Source:*

GEO Year Book 2007

<http://www.unep.org/geo/yearbook/yb2007/>

## **NATURAL DISASTERS**

### **Fourth Assessment Report Climate Change 2007**

*Military Implications:*

Relevant military personnel should get the complete reports (and/or their drafts) for a comprehensive overview of the “state of the planet” and to review the policy considerations, since they might set the ground for further international negotiations and priority setting.

*Sources:*

Intergovernmental Panel on Climate Change (IPCC) <http://www.ipcc.ch/>  
Assessment Reports <http://www.ipcc.ch/activity/ar.htm>

## **International Early Warning Programme to Begin Operations**

*Military Implications:*

Relevant military personnel should review the Strategic Plan of the International Early Warning Programme (IEWP) and the outcomes of the First Advisory Group Meeting to find implications for military cooperation. Military logistics personnel should consider making recommendations for national preparedness plans and eventually update previous military plans to support disaster responses.

*Sources:*

International Strategy for Disaster Reduction. Platform for the Promotion of Early Warning  
<http://www.unisdr.org/ppew/>

The International Early Warning Programme (IEWP) Strategic Plan  
[http://www.unisdr.org/ppew/iewp/pdf/IEWP\(I\)-7.pdf](http://www.unisdr.org/ppew/iewp/pdf/IEWP(I)-7.pdf)

Pushing ahead with global disaster early-warning system, UN convenes experts meeting  
<http://www.un.org/apps/news/story.asp?NewsID=22010&Cr=disaster&Cr1=>

First Advisory Group Meeting, 26-27 March 2007, Bonn, Germany  
<http://www.unisdr.org/ppew/iewp/meetings.htm>

## **Global Security linked to Climate Change**

*Military Implications*

[Same as previous on similar issues] Extreme weather conditions, threats to food supply, and loss of livelihood (mostly in already problem-ridden regions) might increase unrest and threaten global stability. The U.S. Army Corps of Engineers—having the logistics and know-how—should consider, or expand, worldwide collaboration with counterparts and international organizations (e.g. the UNU Institute for Environment and Human Security in Bonn) to determine priorities on which communities need what kind of help from a network of state and international agencies. Also, the issue of environmental refugees should be tackled swiftly to avoid conflicts that this rising segment of world population might cause.

*Sources:*

Climate change seen fanning conflict and terrorism

<http://www.sciam.com/article.cfm?chanID=sa003&articleID=F416D0FBCE436DDE50730DF3A12BBA3B>

Nigerian houses swallowed by sand

<http://news.bbc.co.uk/2/hi/africa/6288445.stm>

Jean Charest panelist at the workshop on the implications of climate change on security

<http://www.premier.gouv.qc.ca/salle-de-presse/communiqués/2007/janvier/2007-01-24-en.shtml> (in French)

DAVOS Trade talks, climate change, Middle East set to dominate WEF UPDATE

<http://www.forbes.com/markets/feeds/afx/2007/01/24/afx3356349.html>

## **Worldwatch Institute: Assessing the Relation between Disasters and Conflict**

### *Military Implications:*

The Worldwatch report might be a source of information for future efforts to address disaster and conflict.

### *Source:*

*Beyond Disasters: Creating Opportunities for Peace*

<http://www.worldwatch.org/node/5126>

Beyond Disasters: Creating Opportunities for Peace

[http://www.wilsoncenter.org/index.cfm?fuseaction=events.event\\_summary&event\\_id=244464](http://www.wilsoncenter.org/index.cfm?fuseaction=events.event_summary&event_id=244464)

(video)

## **Adaptation and Vulnerability Report by the IPCC**

### *Military Implications*

[Same as previous on similar issues] Increasingly more compelling evidences and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects.

### *Sources:*

*Climate Change 2007: Impacts, Adaptation and Vulnerability*

<http://www.ipcc.ch/SPM6avr07.pdf>

UN Climate Change Impact Report: Poor Will Suffer Most

<http://www.ens-newswire.com/ens/apr2007/2007-04-06-01.asp>

Deep Pockets Needed for Climate Change Adaptation

<http://www.ens-newswire.com/ens/apr2007/2007-04-09-01.asp>

UN Experts Near Deal on Climate After Disputes

<http://www.planetark.com/dailynewsstory.cfm/newsid/41284/story.htm>

## **Population Trends and Environmental Impact**

### *Military Implications:*

Relevant military personnel should review these reports for population projections that are important for developing adequate early warning and preparedness systems, as well as for developing strategies for preventing eventual conflicts due to scarcities and increasingly probable disasters—mostly in coastal areas.

### *Sources:*

U.S. National Report on Population and the Environment

[http://www.cepnet.org/documents/USNatlReptFinal\\_000.pdf](http://www.cepnet.org/documents/USNatlReptFinal_000.pdf)

Press Release <http://www.cepnet.org/documents/USNatlReptPressReleaseFINAL8-30-06.doc>

Mapping Future Population Growth

<http://www.signonsandiego.com/news/science/20060817-9999-lz1c17popula.html>

Where will people live in the year 2025? (PDF) map

<http://www.signonsandiego.com/uniontrib/20060817/images/world.pdf>

## **Indian Ocean Tsunami Warning System Declared Operational, but Local Coordination still Lacking**

### *Military Implications:*



Since the military has the capability to help in the event of another major tsunami, it should have some appropriate connection with the central warning system and eventually—until local connections are better established—try to help coordinate local warning and evacuation situations.

*Sources:*

Indian Ocean Tsunami Warning System up and running

[http://portal.unesco.org/en/ev.php-URL\\_ID=33442&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/en/ev.php-URL_ID=33442&URL_DO=DO_TOPIC&URL_SECTION=201.html)

UN-backed tsunami early warning system set to become operation in Indian Ocean

<http://www.un.org/apps/news/story.asp?NewsID=19030&Cr=tsunami&Cr1=>

Latest tsunami shows need for complete warning system: UN regional group

<http://www.un.org/apps/news/story.asp?NewsID=19286&Cr=tsunami&Cr1=>

## **Indian and Chinese Assessments of Climate Change Consequences**

*Military Implications*

[Same as previous on similar issues] Increasingly more compelling evidences and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects.

*Sources:*

Bangladesh: A nation in fear of drowning

[http://news.independent.co.uk/environment/climate\\_change/article2458848.ece](http://news.independent.co.uk/environment/climate_change/article2458848.ece)

Global Warming to Devastate Indian Coast – Expert

<http://www.planetark.com/dailynewsstory.cfm/newsid/41512/story.htm>

China Says Global Warming Threatens Development

<http://www.planetark.com/dailynewsstory.cfm/newsid/41506/story.htm>

## **China to Launch Climate Adaptation Program**

*Military Implications:*

Climate change is now among the highest priorities on the international agenda and it is expected that international efforts for planning for adaptation and mitigation will be intensified. The U.S. Army Corps of Engineers—having the logistics and know-how—should increase worldwide collaboration with counterparts and international organizations.

*Source:*

China prepares to launch climate adaptation plans

<http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MjI4MTM>

## **Indigenous Peoples Highly Vulnerable to Climate Change**

*Military Implications*

[Same as previous on similar issues] Increasingly more compelling evidences and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects.

*Sources:*

Symposium: Indigenous Peoples and Climate Change. Thursday and Friday, 12-13 April 2007

Environmental Change Institute, University of Oxford

<http://www.eci.ox.ac.uk/news/events/070412conference.php>

Indigenous Peoples: the forgotten 'polar bears'?

<http://www.admin.ox.ac.uk/po/news/2006-07/apr/17.shtml>

Indigenous Peoples on Climate Change Front Lines

<http://www.ens-newswire.com/ens/apr2007/2007-04-19-03.asp>

## ENERGY SECURITY

### **World Energy Outlook 2006 Warns on Energy Security and Environmental Implications of Increasing Energy Demands**

#### *Military Implications:*

Military institutions have to develop rigorous strategies to combat the two main issues of insecure and inadequate energy supplies, and environmental damage, and to look beyond the upfront investment costs of making these changes in order for their operations to be more cost effective in the long run. There is a paradox to be resolved; the energy input to military materiel and operations has historically been on an upward curve, as potential and actual combatants seek to overwhelm opponents by sheer force.

#### *Sources:*

WEO 2006 <http://www.worldenergyoutlook.org/2006.asp>

The *World Energy Outlook 2006* Maps Out a Cleaner, Cleverer and More Competitive Energy Future

[http://www.iea.org/Textbase/press/pressdetail.asp?PRESS\\_REL\\_ID=187](http://www.iea.org/Textbase/press/pressdetail.asp?PRESS_REL_ID=187)

### **EU Energy and Climate Change Policy**

#### *Military Implications:*

The military should follow the developments of these proposals that might result in new environmental regulations and new standards policies, and consequently emerging strategies, to ensure that military activities comply with the new requirements.

#### *Sources:*

European Council conclusions

[http://www.consilium.europa.eu/ueDocs/cms\\_Data/docs/pressData/en/ec/93135.pdf](http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/93135.pdf)

Hope for major headway on climate protection

[http://www.eu2007.de/en/News/Press\\_Releases/March/0309BKER.html](http://www.eu2007.de/en/News/Press_Releases/March/0309BKER.html)

Business: 'Climate action useless without global support'

<http://www.euractiv.com/en/climate-change/business-climate-action-useless-global-support/article-162543>

EU's 2020 energy goals to cost over €1 trillion

<http://euobserver.com/9/23800>

### **European Action Plan on Energy Efficiency**

#### *Military Implications:*

The military should consider following the EU new environmental regulations and new standards policies and the consequently emerging strategies, to ensure that its activities in the region comply with the new requirements.

#### *Sources:*

Saving 20% by 2020: European Commission unveils its Action Plan on Energy Efficiency

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1434&format=HTML&aged=0&language=EN&guiLanguage=en>

## **China's Climate Change and S&T Action Plan**

### *Military Implications*

This is another opportunity to explore ways of applying the Army's Strategy on the Environment internationally. Military representatives in China should contact their counterparts to exchange ideas on how the military cooperation can contribute in environmentally oriented science and technology activities.

### *Sources:*

China's National Climate Change Programme

<http://en.ndrc.gov.cn/newsrelease/P020070604561191006823.pdf>

S&T to underpin China's climate activities

<http://www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=3687&language=1>

China Struggling to Control Urban Pollution

[http://english.sepa.gov.cn/zwxx/hjyw/200706/t20070612\\_105064.htm](http://english.sepa.gov.cn/zwxx/hjyw/200706/t20070612_105064.htm)

China now no. 1 in CO2 emissions; USA in second position

<http://www.mnp.nl/en/dossiers/Climatechange/moreinfo/Chinanowno1inCO2emissionsUSAinsecondposition.html>

## C. Protecting the Environment Due to Its Inherent Moral Value

### ENVIRONMENTAL SECURITY-RELATED INTERNATIONAL REGULATIONS THAT HAVE BEEN COMING INTO FORCE SINCE JUNE 2006 (listed in alphabetical order)

#### Europe's Chemical Regulation (REACH) Entered into Force on June 1, 2007

##### *Military Implications:*

The military should assess the REACH system's impacts on military operations in Europe in relation to existing SOFAs and other agreements, and intensify efforts to find safer alternatives to banned chemicals or those deemed to be of high concern for human health and the environment.

##### *Sources:*

New European Chemicals Agency starts operations as REACH enters into force

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/745&format=HTML&aged=0&language=EN&guiLanguage=en>

REACH: Commission welcomes European Parliament vote on new EU chemicals legislation

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1799&format=HTML&aged=0&language=EN&guiLanguage=en>

Environment: Commission welcomes Council action on REACH, climate change and marine protection

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1826&type=HTML&aged=0&language=EN&guiLanguage=en>

Japan Chemical Industry Concerned over New EU Rules

<http://www.planetark.com/dailynewsstory.cfm/newsid/39501/story.htm>

EU law has Del. companies watching

<http://www.delawareonline.com/apps/pbcs.dll/article?AID=/20061226/NEWS/612260355/-1/NEWS01>

#### Canadian Chemical Plan May Go beyond REACH as Environmentalists Get New Political Support

##### *Military Implications:*

Considering the strong collaboration between Canada and the U.S., as well as the CEC rules on cross-border pollution, the military should follow the development of the new Canadian environmental policies and be prepared—along with its contractors—to comply with new regulations that might affect its operations.

##### *Sources:*

Harper's slow action on chemicals is toxic, says Dion

[https://www.liberal.ca/news\\_e.aspx?type=news&id=12111](https://www.liberal.ca/news_e.aspx?type=news&id=12111)

Rising tide

<http://www.ekos.com/admin/articles/TheStar09Dec2006c.pdf>

Conservatives cracking down on toxic chemicals

<http://www.cbc.ca/canada/newfoundland-labrador/story/2006/12/08/toxic-chemicals.html>

Species at Risk. Submission ID: SEM-06-005

<http://www.cec.org/citizen/submissions/details/index.cfm?varlan=english&ID=114>

Determination [http://www.cec.org/files/pdf/sem/06-5-DET14\\_1\\_2\\_en.pdf](http://www.cec.org/files/pdf/sem/06-5-DET14_1_2_en.pdf)

### **UN Nuclear Terrorism Convention Enters into Force on July 7, 2007**

#### *Military Implications:*

Although the U.S. is not yet Party to the Convention, the military should seek to enhance its international anti-nuclear terrorism collaboration within the framework of the Convention where possible. Environmental relatedness of this Convention derives from the extreme devastation possible from cheap, low-level radiation weapons within the budgets of terrorists.

#### *Sources:*

International Convention for the Suppression of Acts of Nuclear Terrorism

<http://untreaty.un.org/ENGLISH/bible/englishinternetbible/partI/chapterXVIII/treaty19.asp>

Ban Ki-moon welcomes new agreement to defeat nuclear terrorism

<http://www.un.org/apps/news/story.asp?NewsID=22892&Cr=nuclear&Cr1=>

### **European Environmental Liability Directive Came Into Force**

#### *Military Implications:*

The Directive's Article 4 Exceptions includes a provision for the military: Paragraph 6 stipulates that "This Directive shall not apply to activities the main purpose of which is to serve national defence or international security nor to activities the sole purpose of which is to protect from natural disasters." However, since the Army Corps of Engineers and other civil-type activities seem not to be covered by the exception, the military and its contractors acting in the European arena should increase attention to the environmental consequences of their activities.

#### *Sources:*

Environment: Liability Directive ensures polluters pay

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/581&format=HTML&aged=0&language=EN&guiLanguage=en>

Environmental liability – Directive

<http://europa.eu/scadplus/leg/en/lvb/l28120.htm>

Directive 2004/35/CE of the European Parliament and of the Council

[http://eur-lex.europa.eu/smartapi/cgi/sga\\_doc?smartapi!celexplus!prod!DocNumber&lg=en&type\\_doc=Directive&an\\_doc=2004&nu\\_doc=35](http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=Directive&an_doc=2004&nu_doc=35)

### **European Directive on Ship-Source Pollution Became Effective on April 1, 2007**

#### *Military Implications:*

Since the Directive stipulates no exception for the military, increased prudence to avoid any negligence or pollution should be considered, as appropriate under Status of forces Agreements. Although the Directive's power is limited to EU waters, increased international cooperation could generate new regulations and marine environmental pollution monitoring systems elsewhere.

#### *Sources:*

New EU rules to crack down on sea pollution come into effect

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/442>

Europe Tightens the Screws on Vessels Polluting Ocean Waters

<http://www.ens-newswire.com/ens/mar2007/2007-03-29-05.asp>

Maritime safety, prevention of pollution caused by ships: penalties for infringements  
<http://www.europarl.europa.eu/oeil/file.jsp?id=230932>

## **Europe to Propose Emissions Targets for All Flights To/From or Within Europe**

### *Military Implications:*

Since the proposed EU regulation mentions no exceptions, the military should explore impacts on its European operations and consult with allied military forces on the significance of that apparent omission.

### *Sources:*

EU wants cap on airline emissions as of 2011

<http://www.euractiv.com/en/environment/article-159741>

EU takes aim at airline emissions

<http://iht.com/articles/2006/11/14/business/emit.php>

## **Europe to Begin Penalizing Jet Pollution in 2011**

### *Military Implications:*

Although the proposed EU regulation now refers just to civil aviation, the military should explore impacts on its European operations and be prepared for an eventually more inclusive regulation.

### *Sources:*

Climate change: Commission proposes bringing air transport into EU Emissions Trading Scheme

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1862&format=HTML&aged=0&language=EN>

Europe Acts to Penalize Jet Pollution

<http://www.nytimes.com/2006/12/21/business/worldbusiness>

## **EU New Directive on Air Pollution**

### *Military Implications:*

The military should consider following the EU new environmental regulations and new standards policies and the consequently emerging strategies, to ensure that its activities in the region comply with the new requirements.

### *Sources:*

Commission welcomes Council agreements on air quality directive, hazardous waste

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1447&format=HTML&aged=0&language=EN&guiLanguage=en>

Climate Change and Air Quality: Press Statement at the Environment Council

<http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/06/624&format=PDF&aged=0&language=EN&guiLanguage=en>

## **Europe Considers Aviation Policies to Reduce Greenhouse Gases**

### *Military Implications:*

This issue should be monitored to see what new requirements might apply to military aviation.

### *Sources:*

EU Parliament Wants Aviation Tax, Emissions Trade



<http://www.planetark.com/dailynewsstory.cfm/newsid/37117/story.htm>

WTTC reacts to EU aviation tax debate

<http://www.breakingtravelnews.com/article/2006071407510441>

## **EU to Introduce New Regulations to Combat Surface Waters Pollution**

### *Military Implications:*

The military units in the EU should follow the development of the new directive and prepare for eventual necessary changes in order to comply with the new regulations.

### *Sources:*

Commission takes action to combat surface water pollution from dangerous substances

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1007&format=HTML&aged=0&language=EN&guiLanguage=en>

Priority substances under the Water Framework Directive

[http://ec.europa.eu/environment/water/water-dangersub/pri\\_substances.htm](http://ec.europa.eu/environment/water/water-dangersub/pri_substances.htm)

## **European Environmental Liability Directive Came Into Force**

### *Military Implications:*

The Directive's Article 4 Exceptions includes a provision for the military: Paragraph 6 stipulates that "This Directive shall not apply to activities the main purpose of which is to serve national defence or international security nor to activities the sole purpose of which is to protect from natural disasters." However, since the Army Corps of Engineers and other civil-type activities seem not to be covered by the exception, the military and its contractors acting in the European arena should increase attention to the environmental consequences of their activities.

### *Sources:*

Environment: Liability Directive ensures polluters pay

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/581&format=HTML&aged=0&language=EN&guiLanguage=en>

Environmental liability – Directive

<http://europa.eu/scadplus/leg/en/lvb/l28120.htm>

Directive 2004/35/CE of the European Parliament and of the Council

[http://eur-lex.europa.eu/smartapi/cgi/sga\\_doc?smartapi!celexplus!prod!DocNumber&lg=en&type\\_doc=Directive&an\\_doc=2004&nu\\_doc=35](http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=Directive&an_doc=2004&nu_doc=35)

## **China Issues Electronic Waste Rules**

### *Military Implications:*

Considering the huge problem of e-waste pollution from electronic imports in developing countries, Chinese measures are likely to inspire other countries in the region to institute tougher restrictions in line with the Environmentally Sound Management (ESM) of Electronic and Electrical Wastes (e-waste) program of action for the Asia-Pacific region. Military organizations, especially those operating in East Asia, should review their policies and practices on electronic waste to ensure that they are prepared to cooperate with such actions.

### *Source:*

China Targets Rising Mountain of High-Tech Junk

<http://www.enn.com/today.html?id=11121>

## PROPOSED TREATIES AND/OR CHANGES TO EXISTING ONES

### **Toxic Waste Management**

#### **UN E-Waste Forum and Basel Convention's Conference of Parties**

##### *Military Implications:*

Relevant military personnel should review the 30 decisions to identify opportunities for international cooperation, furtherance of the Army's Strategy on the Environment, and to better anticipate potential new directives, such as e-waste management additions to the Basel Convention and a ship recycling procedure.

##### *Sources:*

Basel Convention COP8 website <http://cop8.basel.int/>

Basel Convention website <http://www.basel.int/>

Summary of the Eighth Conference of the Parties to the Basel Convention  
<http://www.iisd.ca/basel/cop8/>

Dealing with toxic computer waste

<http://news.bbc.co.uk/2/hi/business/6110018.stm>

#### **European Parliament Proposes Tougher Waste Management Strategy**

##### *Military Implications:*

Since no exception is stipulated for any sector, the Army should consider revising its waste management practices in the European arena to comply with the new directives.

##### *Sources:*

Major recycling operation for Europe's waste policy

[http://www.europarl.europa.eu/news/expert/infopress\\_page/064-3005-043-02-07-911-20070208IPR02886-12-02-2007-2007-false/default\\_en.htm](http://www.europarl.europa.eu/news/expert/infopress_page/064-3005-043-02-07-911-20070208IPR02886-12-02-2007-2007-false/default_en.htm)

MEPs vote to cut waste mountain

<http://news.bbc.co.uk/1/hi/world/europe/6355845.stm>

#### **Toxic Waste Disposal of Global Growing Concern**

##### *Military Implications:*

Considering the increasing attention to waste disposal processes and regulation enforcement, as well as their link to security, it is likely that the Basel Convention will be strengthened and/or special regulations will be set for toxic waste treatment. The military should carefully follow these new developments and be prepared to comply with eventual new directives. Furthermore, it should eventually incorporate observing hazardous waste disposal procedures and trade as part of its security actions in countries where it has peacekeeping forces. This would also be consistent with the stewardship goal in the Army's Environmental Strategy.

##### *Sources:*

Deadly toxic waste dumping in Côte d'Ivoire clearly a crime – UN environmental agency

<http://www.un.org/apps/news/story.asp?NewsID=20083&Cr=ivoire&Cr1=>

Africa: The world's 'septic tank'

[http://www.mg.co.za/articlePage.aspx?articleid=284851&area=/insight/insight\\_africa/](http://www.mg.co.za/articlePage.aspx?articleid=284851&area=/insight/insight_africa/)

Poisonous days

[http://www.electriceconomist.com/world/africa/displaystory.cfm?story\\_id=7923227](http://www.electriceconomist.com/world/africa/displaystory.cfm?story_id=7923227) (by subscription only)

Ivory Coast Tragedy Prompts Call for Stricter Toxic Waste Treaty

<http://www.ens-newswire.com/ens/sep2006/2006-09-11-03.asp>

Toxic waste mystery in Ivory Coast deepens

<http://www.newscientist.com/article/dn10097-toxic-waste-mystery-in-ivory-coast-deepens.html>

## **Chemical and Biological Safety**

### **UN Nuclear Terrorism Convention Enters into Force on July 7, 2007**

#### *Military Implications:*

Although the U.S. is not yet Party to the Convention, the military should seek to enhance its international anti-nuclear terrorism collaboration within the framework of the Convention where possible. Environmental relatedness of this Convention derives from the extreme devastation possible from cheap, low-level radiation weapons within the budgets of terrorists.

#### *Sources:*

International Convention for the Suppression of Acts of Nuclear Terrorism

<http://untreaty.un.org/ENGLISH/bible/englishinternetbible/partI/chapterXVIII/treaty19.asp>

Ban Ki-moon welcomes new agreement to defeat nuclear terrorism

<http://www.un.org/apps/news/story.asp?NewsID=22892&Cr=nuclear&Cr1=>

### **Stockholm Convention on POPs Adopts Evaluation but not Non-compliance Mechanisms**

#### *Military Implications*

[Similar to previous on the same issue] Although the U.S. did not ratify the Convention, it should be prepared to comply with its requirements when acting in countries Party. Thus, in addition to the preparation for phase-out of the POPs banned, it should consider the military implications of the additional decisions adopted by the COP-3 and those proposed to be put forward at COP-4.

#### *Sources:*

Stockholm Convention COP-3

[http://www.pops.int/documents/meetings/cop\\_3/meetingdocs/default.htm](http://www.pops.int/documents/meetings/cop_3/meetingdocs/default.htm)

Summary of the Third Meeting of the Stockholm Convention on Persistent Organic Pollutants

<http://www.iisd.ca/vol15/enb15154e.html>

Stockholm Convention <http://www.pops.int>

### **Eleventh Chemical Weapons Convention**

#### *Military Implications:*

The state of current and potential future non-lethal weapons should be reviewed in light of possible violations of the CWC. [Similar to previous on the same issue] Those with responsibilities that might be affected by the results of the conference should visit the U.S. Chemical Weapons Convention website <http://www.cwc.gov>, noting national and international opportunities for assisting in compliance with the CWC regulations.

#### *Sources:*

Chemical Incapacitants Must Be Kept From War, Experts Say

[http://www.nti.org/d\\_newswire/issues/2006\\_12\\_7.html#C1839F43](http://www.nti.org/d_newswire/issues/2006_12_7.html#C1839F43)

Weapons of Terror

[http://www.wmdcommission.org/files/Weapons\\_of\\_Terror.pdf](http://www.wmdcommission.org/files/Weapons_of_Terror.pdf)

Annan calls on governments to destroy 'cruel and inhumane' chemical weapons

<http://www.un.org/apps/news/story.asp?NewsID=20854&Cr=chemical&Cr1=weapon>

U.S., Partners to Offer New Program of CWC Support

[http://www.nti.org/d\\_newswire/issues/2006\\_12\\_7.html#95296BAD](http://www.nti.org/d_newswire/issues/2006_12_7.html#95296BAD)

Nations Get CW Treaty Extensions

[http://www.nti.org/d\\_newswire/issues/2006\\_12\\_11.html#263C85C9](http://www.nti.org/d_newswire/issues/2006_12_11.html#263C85C9)

## **Call for Reinforcements to Chemical Safety**

### *Military Implications:*

The military should follow the work of the Intergovernmental Forum on Chemical Safety and eventually provide input to new safety policies. Although these might not result in legally binding agreements, the discussions will most probably assess the effectiveness of existing chemical safety-related legislation and eventually generate new enforcement and/or safety issues for resolution.

### *Sources:*

Forum V; Chemical Safety for Sustainable Development

<http://www.who.int/ifcs/forums/five/en/index.html>

Health and environmental concerns associated with heavy metals; global needs for further action?

[http://www.who.int/ifcs/documents/forums/forum5/side\\_events/en/index.html](http://www.who.int/ifcs/documents/forums/forum5/side_events/en/index.html)

## **Better International Controls Needed to Prevent Bioterrorism**

### *Military Implications:*

Relevant military and diplomatic personnel should liaise with those drafting improved international legal and enforcement frameworks to prevent bioterrorism, and then cooperate with their international counterparts for the improved control regimes.

### *Sources:*

Custom-Built Pathogens Raise Bioterror Fears

<http://www.washingtonpost.com/wp-dyn/content/article/2006/07/30/AR2006073000580.html>

(by subscription only)

The Secretive Fight Against Bioterror

<http://www.washingtonpost.com/wp-dyn/content/article/2006/07/29/AR2006072900592.html?sub=AR>

(by subscription only)

A spy among us?

<http://www.baltimoresun.com/news/nationworld/bal-te.detrick30jul30,0,2573448.story>

No action on bio-terrorism loophole

<http://www.guardian.co.uk/science/story/0,1834550,00.html?gusrc=rss&feed=18>

China to tighten biological export control

[http://english.people.com.cn/200607/29/eng20060729\\_287991.html](http://english.people.com.cn/200607/29/eng20060729_287991.html)

## **Human Biomonitoring for Environmental Chemicals**

### *Military Implications:*

Military personnel concerned with biomonitoring should review the report since its findings and recommendations might find their way in new national and possibly international policies on biomonitoring. Also, they might be useful for improving military biomonitoring strategies.

*Source:*

Human Biomonitoring for Environmental Chemicals

<http://www.nap.edu/catalog/11700.html>

## **Nuclear Nonproliferation Treaty Stalemate Continues**

*Military Implications:*

[Same as previous on this issue] The military should seek alternative means that might be more effective to work with the appropriate agencies to facilitate the NPT negotiations to improve global nuclear safety than is now the case.

*Sources:*

Preparatory Committee for the 2010 Non-Proliferation Treaty Review Conference

<http://www.un.org/NPT2010/index.html>

Countries Join U.S.-Russia-led Global Initiative To Combat Nuclear Terrorism

<http://www.state.gov/r/pa/prs/ps/2007/may/84503.htm>

Current Partner Nations to the Global Initiative to Combat Nuclear Terrorism

<http://www.state.gov/t/isn/82787.htm>

## **Pollution and Greenhouse Gases**

### **2007—The International Year of the Ozone Layer**

*Military Implications:*

The anniversary of the Protocol could trigger additional meetings and research to better understand ozone-depleting factors, which might further expand the list of ozone-depleting substances covered by the Montreal Protocol. The military should follow these events to know if new material substitutes will be required.

*Sources:*

Gallon Newsletter (By e-mail)

Montreal Protocol <http://hq.unep.org/ozone/Montreal-Protocol/Montreal-Protocol2000.shtml>

UNEP Ozone Theme <http://unep.org/themes/ozone/>

The Ozone Hole <http://www.theozonehole.com/montreal.htm>

NASA and NOAA Announce Ozone Hole is a Double Record Breaker

[http://www.nasa.gov/vision/earth/environment/ozone\\_resource\\_page.html](http://www.nasa.gov/vision/earth/environment/ozone_resource_page.html)

### **Countries Contemplating Tougher Regulations for Mandatory Emission Targets**

*Military Implications:*

Leadership by the EU, Japan and Australia may stimulate others to set mandatory emission targets, eventually bringing increased attention to military emission practices. Military liaisons in these countries might seek opportunities for collaboration in emissions reductions.

*Sources:*

Factbox - UK Response to Stern Review on Climate Change

<http://www.planetark.com/dailynewsstory.cfm/newsid/38740/story.htm>

Analysis - Japan Needs Policy Overhaul to Avoid Kyoto Failure

<http://www.planetark.com/dailynewsstory.cfm/newsid/38709/story.htm>

Australia to Push for "New Kyoto" in Asia

<http://www.planetark.com/dailynewsstory.cfm/newsid/38807/story.htm>

Australia plans world's largest carbon storage system

<http://www.terradaily.com/2006/061123072009.p1jncbk1.html>

## **UK Proposes Individual Carbon Trading**

*Military Implications:*

It is not clear at this point if the points-based system will affect just individuals, or will also be extended to industry sectors including the military. If it is extended to military activities and personnel, then training for reduced carbon emissions should be explored for personnel based in the UK.

*Source:*

Miliband unveils carbon swipe-card plan

<http://www.guardian.co.uk/climatechange/story/0,,1824241,00.html> (article accessible free for a limited time; otherwise, subscription required)

## **Energy Saving**

### **Ban on Incandescent Light Bulbs Expands**

*Military Implications:*

In anticipation of these restrictions (and because of CFLs' inherent advantages), the military should begin planning for an eventual worldwide switchover to the new devices.

*Sources:*

Lighting the Way to a Greener Future: Canada's New Government to Ban Inefficient Light Bulbs

<http://news.gc.ca/cfmx/view/en/index.jsp?articleid=295459&>

Ontario turns out the lights on inefficient bulbs

<http://www.cbc.ca/canada/toronto/story/2007/04/18/ontario-lightbulb-ban.html>

Australia says lights out to incandescent bulbs

<http://www.cbc.ca/technology/story/2007/02/20/tech-bulb.html>

### **Compact Fluorescent Light Bulbs (CFLs) May Surge to Fore**

*Military Implications:*

In anticipation of these restrictions (and because of CFLs' inherent advantages), the military should begin planning for an eventual worldwide switchover to the new devices.

*Source:*

California may Ban Conventional Lightbulbs by 2012

<http://www.planet2025news.net/ntext.rxml?id=4032&photo=>

### **European Lamp Companies Push Compact Fluorescents, as Does the EU**

*Military Implications:*



These steps indicate that the military should give a high priority to planning for worldwide conversion to CFLs.

*Source:*

European Lighting Industry Agrees to Push Energy-Saving Bulbs

<http://www.enn.com/today.html?id=12318>

## **Post-Kyoto Protocol Negotiations**

### **UN Climate Change Conference Explores Post-Kyoto Regulations**

*Military Implications:*

The military should continue to accelerate efforts to reduce their own greenhouse gas emissions. These remarks are offered with the realization that the U.S. military may already be among the institutions most compliant with greenhouse gas emission standards, but that good performance might not be good enough in coming years. New international environmental security-related policies and cooperation to avoid potentially large-scale disasters and conflicts seem inevitable. Hence, the military should follow the evolution of these discussions to better anticipate future requirements.

*Sources:*

Summary of the Twelfth Conference of The Parties To The UN Framework Convention On Climate Change and Second Meeting of The Parties To The Kyoto Protocol

<http://www.iisd.ca/vol12/enb12318e.html>

United Nations Climate Change Conference - Nairobi 2006

[http://unfccc.int/meetings/cop\\_12/items/3754.php](http://unfccc.int/meetings/cop_12/items/3754.php)

### **Moves Forward on the Post-Kyoto Negotiations**

*Military Implications:*

The military should continue to accelerate efforts to reduce their own greenhouse gas emissions. These remarks are offered with the realization that the U.S. military may already be among the institutions most compliant with greenhouse gas emission standards, but that good performance might not be good enough in coming years. New international environmental security-related policies and cooperation to avoid potentially large-scale disasters and conflicts seem inevitable. Hence, the military should follow the evolution of these discussions to better anticipate future requirements.

*Source:*

Environment: Commission welcomes Council action on REACH, climate change and marine protection

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1826&type=HTML&aged=0&language=EN&guiLanguage=en>

Secretary-General Welcomes G-8 Agreement on 'Strong and Early Action' To Combat Climate Change

<http://www.un.org/News/Press/docs//2007/sgsm11029.doc.htm>

Australia's Howard Plans Asia-Pacific Kyoto Successor

<http://www.planetark.com/dailynewsstory.cfm/newsid/42494/story.htm>

Denmark seeks global climate deal in 2009

<http://euobserver.com/877/24147/?rk=1>

Climate Change 'Defining Issue of Our Era,' Says Ban Ki-Moon, Hailing G8 Action

<http://www.un.org/apps/news/story.asp?NewsID=22836&Cr=&Cr1=>

Struggling to save the planet. *The Economist*, May 31st 2007

[http://www.economist.com/world/international/displaystory.cfm?story\\_id=9261663](http://www.economist.com/world/international/displaystory.cfm?story_id=9261663)

Call For "Disaster Diplomacy" as Millions Are Affected

<http://www.worldwatch.org/node/5127>

## **Possible Tougher Policies Concerning Climate Change**

### *Military Implications:*

There is compelling evidence of the consequences of anthropogenic climate change, and a growing world demand for action. The military should continue to accelerate efforts to reduce their own greenhouse gas emissions. New international environmental security-related policies and cooperation to avoid potentially large-scale disasters and conflicts seem inevitable.

### *Sources:*

Dangerous climate change is hitting Africa hard say top aid and environment groups

<http://www.neweconomics.org/gen/africaupinsmoke.aspx>

Africa—Up in Smoke 2. The second report on Africa and global warming from the Working Group on Climate Change and Development

[http://www.neweconomics.org/gen/z\\_sys\\_PublicationDetail.aspx?pid=232](http://www.neweconomics.org/gen/z_sys_PublicationDetail.aspx?pid=232)

Merkel to Target Climate Change as G8, EU Leader

<http://www.dw-world.de/dw/article/0,2144,2188336,00.html>

## **Clean Development Mechanism (CDM) successful**

### *Military Implications*

[Same as previous on similar issues] The military should continue to reduce its environmental footprint, develop strategies to mitigate climate change effects, explore the military roles in addressing environmental refugee issues, and cooperate where possible with others to these ends.

### *Sources:*

Deadlock at climate talks mars Kyoto hopes

<http://www.alertnet.org/thenews/newsdesk/L1840731.htm>

EU rejects 'weak' UN paper on climate change

<http://euobserver.com/9/24053/?rk=1> (by subscription only; full text in the [Appendix](#))

Commission on Sustainable Development (CSD) 115<sup>th</sup> session

<http://www.un.org/esa/sustdev/csd/policy.htm>

Australia demands "New Kyoto" in place of "Old"

<http://www.alertnet.org/thenews/newsdesk/SYD71858.htm>

Human tide: the real migration crisis. <http://www.christian-aid.org.uk/indepth/705caweekreport/index.htm>

## **Biological Diversity**

## **New Sites Added to World's Protected Biosphere Reserves**

### **New Strategy of UNESCO World Heritage Committee for Heritage Sites and Climate Change**

#### *Military Implications:*

The military should keep up-to-date with the list of protected and/or endangered sites and plan its operations accordingly. Citing the Army's "Strategy for the Environment," the military should seek new opportunities to participate in dialogues among scientists, politicians, environmental NGOs, and economic decision-makers for improving biodiversity management strategies, as well as in planning its own operations. Also, Arctic missions may provide new information on global environmental changes and may be relevant to the U.S. military's interest in the Northwest Passage. Military scenarios should also be considered to respond to disasters affecting indigenous arctic peoples.

#### *Sources:*

Twenty-five biosphere reserves added to UNESCO's Man and the Biosphere (MAB) Network

[http://portal.unesco.org/en/ev.php-URL\\_ID=35389&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/en/ev.php-URL_ID=35389&URL_DO=DO_TOPIC&URL_SECTION=201.html)

World Heritage Committee adopts strategy on heritage and climate change

<http://whc.unesco.org/en/news/262>

Swiss Map Permafrost After Signs Alps Crumbling

<http://www.planetark.com/dailynewsstory.cfm/newsid/37442/story.htm>

Global Warming Puts 12 US Parks at Risk – Report

<http://www.planetark.com/dailynewsstory.cfm/newsid/37391/story.htm>

## **International Polar Year 2007-2008**

#### *Military Implications:*

In view of the increasing importance of the Arctic in military planning and the oil reserves that will eventually be accessible due to climate change in the Arctic, overlapping national boundaries of the U.S., Russia, Norway, Denmark, and Canada, appropriate military personnel should liaise with the body of IPY researchers to exchange information and ideas. They should focus especially on the environmental impact of military operations in the polar regions and to be updated on such developments as new scientific discoveries, long-range oil issues, and possible emerging new policies.

#### *Sources:*

ESA contribution to International Polar Year 2007-2008

[http://www.esa.int/esaCP/SEMG1DN0LYE\\_Protecting\\_0.html](http://www.esa.int/esaCP/SEMG1DN0LYE_Protecting_0.html)

U.S. Launches International Polar Year on Feb. 26

[http://www.nsf.gov/news/news\\_summ.jsp?cntn\\_id=108408](http://www.nsf.gov/news/news_summ.jsp?cntn_id=108408)

Huge polar study ready to begin

<http://news.bbc.co.uk/2/hi/science/nature/6389857.stm>

## **United Nations Agreement to Protect the World's Forests Adopted**

#### *Military Implications:*

The document should be reviewed for implications on military usage of land and forests, especially during future training missions.

#### *Sources:*

UN adopts new International Agreement to protect world's forests

<http://www.un.org/apps/news/story.asp?NewsID=22389&Cr=forests&Cr1=>

New Agreement on Sustainable Management of World's Forests Focus, As United Nations Forum Opens Two-Week Session

<http://www.un.org/News/Press/docs/2007/envdev919.doc.htm>

UNFF7 Documents

<http://www.un.org/esa/forests/session-documents.html>

## **Marine Environment**

### **Political Agreement Reached on the European Marine Strategy Directive**

*Military Implications:*

Relevant military personnel should be alert to new requirements imposed by the Marine Strategy Directive. Although the Directive's power is limited to EU waters, increased international cooperation could generate new regulations and marine environmental pollution monitoring systems elsewhere.

*Sources:*

Environment: Commission welcomes Council action on REACH, climate change and marine protection

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1826&type=HTML&aged=0&language=EN&guiLanguage=en>

Strategy for the marine environment

<http://europa.eu/scadplus/leg/en/lvb/l28164.htm>

A Marine Strategy to save Europe's seas and oceans

<http://ec.europa.eu/environment/water/marine.htm>

Regionalization of the EU waters

<http://www.eurocean.org/contents.php?id=392>

### **International Conference and Assessments Find Rising Ocean Pollution**

*Military Implications:*

Environmental surveillance and data analysis is improving the amount and quality of the information needed to help reduce marine pollution. In addition to improving its own environmental performance, the military should consider offering assistance in regions where pollution control is inadequate.

*Sources:*

Integrated Water Management Key to Cleaning-up Oceans

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=486&ArticleID=5387&l=en>

Concern Over Oceans Despite Receding Oil & Chemical Threats

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=486&ArticleID=5364&l=en>

Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities

<http://www.gpa.unep.org/bin/php/home/index.php>

*The State of the Marine Environment: Trends and Processes*

[http://www.gpa.unep.org/document\\_lib/en/pdf/report2-webversion\\_\(global\\_soe\).pdf](http://www.gpa.unep.org/document_lib/en/pdf/report2-webversion_(global_soe).pdf)

Further Rise in Number of Marine ‘Dead Zones’

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=486&ArticleID=5393&l=en>

Curbing Coastal Pollution Aids Recovery of Heat-Stressed Corals

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=486&ArticleID=5392&l=en>

## **Commercial Whaling Ban Strengthened by International Whaling Commission (IWC)**

*Military Implications:*

The overwhelming vote in favor of the resolution to keep the ban reveals a clear trend towards strengthening marine conservation regulations’ enforcement systems. However, precedents show that, in the case of whales, Japan repeatedly violated the moratorium. If so, then the military might at some point be asked to help in monitoring compliance.

*Sources:*

Commercial whaling ban strengthened at Anchorage whaling meeting

<http://www.greenpeace.org/international/news/commercial-whaling-ban-strengt>

Draft Resolution CITES, IWC/59/19 Agenda Item 14.3

[http://www.iwcoffice.org/\\_documents/commission/IWC59docs/59-19.pdf](http://www.iwcoffice.org/_documents/commission/IWC59docs/59-19.pdf)

## **Roadmap for Establishing the Global System of Marine Protected Areas**

*Military Implications:*

Relevant military personnel should consider reviewing the roadmap for eventual new directives and/or regulations that might be triggered by its implementation.

*Sources:*

New road map for establishing marine protected area networks

[http://www.iucn.org/en/news/archive/2007/04/11\\_marine\\_protected\\_areas.htm](http://www.iucn.org/en/news/archive/2007/04/11_marine_protected_areas.htm)

Establishing Networks of Marine Protected Areas – Making It Happen

<http://www.iucn.org/themes/wcpa/biome/marine/mpanetworks/networks.html>

## **New Marine Protected Areas Proposed**

*Military Implications:*

The military should study the proposals’ impact on its activities in the respective areas and be prepared to comply with possible new restrictions.

*Sources:*

Whale Protections Proposed for Strait of Gibraltar

<http://www.ens-newswire.com/ens/mar2007/2007-03-05-02.asp>

Urgent protection proposed for whale and dolphin habitats in the Mediterranean and Black Seas

[http://www.cetaceanhabitat.org/view\\_all\\_news.php#](http://www.cetaceanhabitat.org/view_all_news.php#)

The state of World Fisheries and Aquaculture 2006

<http://www.fao.org/docrep/009/A0699e/A0699e00.htm>

Slow Down and Watch Out for Whales, Spain Tells Ships in Strait of Gibraltar

<http://www.enn.com/today.html?id=12286>

WWF launches marine protection campaign in the Southern Ocean

[http://www.panda.org/news\\_facts/newsroom/index.cfm?uNewsID=95080](http://www.panda.org/news_facts/newsroom/index.cfm?uNewsID=95080)

## **Malacca Straits Need Increased Protection from Various Security Threats**

### *Military Implication:*

Relevant military personnel should liaise with counterparts in the region and explore opportunities for collaboration in both counter-piracy/terrorism measures and environmental protection and cleanup.

### *Source:*

Malacca, Asia's Most Important Sea Lane

<http://theseoultimes.com/ST/?url=/ST/db/read.php?idx=4957>

## **Network of Marine Educators Formed to Protect Pacific**

### *Military Implications:*

In view of increasing activity to protect the oceans, especially the Pacific, and of the high level of US operations in the area, appropriate military personnel, e.g. in USPACOM, should establish liaison with this network (through [Sylvia.spalding@noaa.gov](mailto:Sylvia.spalding@noaa.gov)) in order to exchange information and ideas with environmental security educators in the region.

### *Sources:*

International Pacific Marine Educators Conference Establishes Network to Protect the Ocean, Presentations Available Online (Press release)

<http://www.ipmec.info/pr.htm>

International Pacific Marine Educators Conference Establishes Network to Protect the Ocean

<http://www.enn.com/net.html?id=1816>

## **Website for Marine Protected Areas and Cetaceans' Sanctuaries**

### *Military Implications:*

The [cetaceanhabitat.org](http://cetaceanhabitat.org) site might be a valuable “one stop shop” for information on protected marine areas. Relevant military personnel should consider consulting it regularly for possible new proposals and information relevant to its high sea activities.

### *Sources:*

Whale Protections Proposed for Strait of Gibraltar

<http://www.ens-newswire.com/ens/mar2007/2007-03-05-02.asp>

Urgent protection proposed for whale and dolphin habitats in the Mediterranean and Black Seas

<http://www.cetaceanhabitat.org>

## **Heavy Metals**

### **Progress on Global Mercury Ban**

#### *Military Implications:*

Relevant military personnel should assess which areas would be affected by an eventual global regulation on the use of mercury and seek replacements.

#### *Sources:*

Summary of the 24th Session of the UNEP Governing Council/Global Ministerial Environment Forum <http://www.iisd.ca/vol16/enb1660e.html>



World leaders agree to phase out mercury

[http://www.int.iol.co.za/index.php?set\\_id=14&click\\_id=143&art\\_id=qw1171231741879B251](http://www.int.iol.co.za/index.php?set_id=14&click_id=143&art_id=qw1171231741879B251)

Ottawa's refusal to join protocol cutting mercury draws critics' fire

<http://www.theglobeandmail.com/servlet/story/LAC.20070210.MERCURY10/TPStory/National>  
(by subscription only)

## **EU Seeking Global Mercury Ban**

### *Military Implications:*

Relevant military personnel should assess which areas would be affected by the mercury export ban (from Europe by 2011) and then by an eventual global regulation on the use of mercury. Such developments could complicate repatriation or movement of materiel.

### *Sources:*

EU seeks global mercury ban

<http://www.euractiv.com/en/environment/eu-seeks-global-mercury-ban/article-160845>

Halting the Child Brain Drain. Why we need to tackle global mercury contamination

[http://www.env-health.org/IMG/pdf/mercury\\_full\\_report.pdf](http://www.env-health.org/IMG/pdf/mercury_full_report.pdf)

Health experts call on EU to impose total ban on use of mercury

<http://www.iht.com/articles/ap/2007/01/10/europe/EU-GEN-EU-Mercury.php>

## **Europe Proposes Ban on Mercury Exports**

### *Military Implications:*

Logistics personnel should review these measures to determine their effect on military materiel planning, and should be prepared to comply with the final set of regulations, as appropriate under status of forces agreements. This development could complicate repatriation of materiel or movement to non-EU nations.

### *Sources:*

Environment: Commission proposes ban on EU mercury exports

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1481&format=HTML&aged=0&language=EN&guiLanguage=en>

EU Parliament Backs Plans to Ban Mercury

<http://www.physorg.com/news82736827.html>

## **IMPROVED COMPLIANCE WITH ENVIRONMENTAL REGULATIONS**

## **European Environmental Liability Directive Came Into Force**

### *Military Implications:*

The Directive's Article 4 Exceptions includes a provision for the military: Paragraph 6 stipulates that "This Directive shall not apply to activities the main purpose of which is to serve national defence or international security nor to activities the sole purpose of which is to protect from natural disasters." However, since the Army Corps of Engineers and other civil-type activities seem not to be covered by the exception, the military and its contractors acting in the European arena should increase attention to the environmental consequences of their activities.

### *Sources:*

Environment: Liability Directive ensures polluters pay

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/581&format=HTML&aged=0&language=EN&guiLanguage=en>

Environmental liability – Directive

<http://europa.eu/scadplus/leg/en/lvb/l28120.htm>

Directive 2004/35/CE of the European Parliament and of the Council

[http://eur-](http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=Directive&an_doc=2004&nu_doc=35)

[lex.europa.eu/smartapi/cgi/sga\\_doc?smartapi!celexplus!prod!DocNumber&lg=en&type\\_doc=Directive&an\\_doc=2004&nu\\_doc=35](http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=Directive&an_doc=2004&nu_doc=35)

## **Environmental Crime Could Become a Felony in the EU**

### *Military Implications:*

At this stage, it seems that the proposal does not contain an exception clause for the military. It is important that the military follow the proposal's progress and its impacts on military operations in Europe in relation to existing SOFAs and other agreements, and as to whether or how it would affect its contractors' activities.

### *Sources:*

Brussels seeks powers to put polluters in jail

<http://euobserver.com/9/23436/?rk=1>

EU may make harming environment a crime

[http://www.montereyherald.com/mld/montereyherald/news/breaking\\_news/16665802.htm](http://www.montereyherald.com/mld/montereyherald/news/breaking_news/16665802.htm)

Brussels in push for 'green crime' laws

[http://www.ft.com/cms/s/a5f881c0-b622-11db-9eea-0000779e2340,dwp\\_uuid=70662e7c-3027-11da-ba9f-00000e2511c8.html](http://www.ft.com/cms/s/a5f881c0-b622-11db-9eea-0000779e2340,dwp_uuid=70662e7c-3027-11da-ba9f-00000e2511c8.html)

## **EU to Increase Environmental Regulations Enforcement**

### *Military Implications:*

The military should consider following the EU new environmental regulations and new standards policies and the consequently emerging strategies, to ensure that its activities in the region comply with the new requirements.

### *Source:*

Preparation Environment Council, 23 October 2006

<http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/06/389&format=HTML&aged=0&language=EN&guiLanguage=en>

## **North America's Commission for Environmental Cooperation to Increase Enforcement of Environmental Regulations and Public Participation**

### *Military Implications:*

CEC projects are a relatively untapped source of information for relevant military personnel dealing with environment and health issues and potential future regulations affecting the military in North America. [Note: a staff member of the Millennium Project participated in the Montreal discussions of the Operational Plan.]

### *Source:*

Operational Plan of the Commission for Environmental Cooperation 2006-2008

[http://www.cec.org/files/PDF/PUBLICATIONS/OpPlan2006-Summary\\_en.pdf](http://www.cec.org/files/PDF/PUBLICATIONS/OpPlan2006-Summary_en.pdf)

## **Biological Weapons Convention**

### **Sixth Review Conference of the Biological Weapons Convention**

#### *Military Implications:*

Without better international controls, terrorist access to biological weapons seems inevitable. Great progress has been made on bioweapons sensors over the past several years, some of which have been referenced in these monthly reports for AEPI. Relevant military personnel should consider making recommendations at the upcoming intersessional meetings.

#### *Source:*

BWC Review Conference Hailed as Success

[http://www.nti.org/d\\_newswire/issues/2006\\_12\\_11.html#60E54D1D](http://www.nti.org/d_newswire/issues/2006_12_11.html#60E54D1D)

Draft Declaration

[http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/1CEE7A27069559C5C125723E00647FBF/\\$file/BWC+CONF.VI+CRP.4-altered+as+ammended.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/1CEE7A27069559C5C125723E00647FBF/$file/BWC+CONF.VI+CRP.4-altered+as+ammended.pdf)

Biological and Toxin Weapons Convention (BTWC) website <http://www.opbw.org/>

## **Kyoto/Climate Change**

### **Lawsuits over Failure to Meet Kyoto Commitments**

#### *Military Implications:*

[Similar to previous on related issues] Lawsuits may one day be filed against the military for its greenhouse gas emissions. The sooner military efforts to reduce greenhouse gas emissions are fully compliant with “best practices” and documented, the less likely it is that the military will be sued for damages. The military should be prepared for more stringent decisions and regulations worldwide against atmospheric emissions. These remarks are offered with the realization that the U.S. military may already be among the institutions most compliant with greenhouse gas emission standards, but that good performance might not be good enough in coming years.

#### *Source:*

Canada faces lawsuit over failure to meet Kyoto commitment

<http://www.terraily.com/2006/061031230116.bm84p217.html>

### **Global Warming Goes to Court**

#### *Military Implications:*

Lawsuits may one day be filed against the military for its greenhouse gas emissions. The sooner military efforts to reduce greenhouse gas emissions are fully compliant with “best practices”, the less likely the military will be sued for damages. The military should be prepared for more stringent decisions and regulations worldwide against atmospheric emissions. These remarks are offered in realization that the U.S. military may already be among the institutions most compliant with greenhouse gas emission standards, but that good might not be good enough in coming years.

#### *Sources:*

Marsden B - A Bad Idea

<http://www.greenpeace.org.nz/campaigns/climate/MarsdenB.asp>

Update: Massachusetts v. EPA

[http://www.treehugger.com/files/2006/10/massachusetts\\_v\\_epa.php](http://www.treehugger.com/files/2006/10/massachusetts_v_epa.php)

Global Warming: Here Come The Lawyers

[http://www.businessweek.com/magazine/content/06\\_44/b4007044.htm](http://www.businessweek.com/magazine/content/06_44/b4007044.htm)

Climate Security: Risks and Opportunities for the Global Economy

[http://www.cfr.org/publication/11511/climate\\_security.html](http://www.cfr.org/publication/11511/climate_security.html)

## **Global Division of Financial Responsibility for Global Warming Impacts**

*Military implications:*

Although Oxfam's system is not likely to be accepted very soon, it seems inevitable that some system will be adopted eventually. If so, then the military should anticipate that it will be called upon to assess its share of national responsibilities.

*Source:*

Rich must pay bulk of climate change bill: Oxfam

<http://www.reuters.com/article/topNews/idUSL2835543520070529>

## **NEW STANDARDS WITH IMPLICATIONS FOR ENVIRONMENTAL SECURITY**

### **Green Standards to Counter E-waste**

*Military Implications:*

Considering the increasing e-waste issue and the influence these organizations have in the global arena, it is fair to speculate that versions of these green measures will be considered for future e-waste regulations. The military should follow these new developments and be prepared to comply with eventual new directives. Also, it should not wait to begin using the lists in its acquisition of electronics to encourage greener companies. That would be consistent with the stewardship goal in the Army's Environmental Strategy.

*Sources:*

How green is your Apple? The Economist print edition, Aug 25th 2006

[http://www.economist.com/business/displaystory.cfm?story\\_id=7836504](http://www.economist.com/business/displaystory.cfm?story_id=7836504) (by subscription only)

Your guide to green electronics

<http://www.greenpeace.org/international/news/green-electronics-guide-ewaste250806>

EPEAT <http://www.epeat.net>

### **ASTM Issues Standard Terminology for Nanotechnology**

*Military Implications:*

Military organizations preparing nanotech-related documents should consult this work to ensure that industry-standard terminology is being used.

*Sources:*

Terminology for Nanotechnology Standard Now Available from ASTM International

<http://69.7.224.88/viewnews.aspx?newsID=996&s=E56>

## **SAFETY ISSUES**

## **Chemical and Biological safety issues**

### **Toxicogenomics Risk Assessment**

#### *Military Implications:*

Military personnel working in environmental risk assessment should review the available presentations from this meeting for eventual input in improving their own toxicogenomic risk assessment processes.

#### *Source:*

Fourteenth meeting of the Committee on Emerging Issues and Data on Environmental Contaminants. Use of Toxicogenomics to Understand Toxic Effects and Improve Risk Assessment: A Workshop. November 13, 2006

[http://dels.nas.edu/emergingissues/toxicogenomics\\_meet14.shtml](http://dels.nas.edu/emergingissues/toxicogenomics_meet14.shtml)

### **New Concerns Rising over Chemical Weapons**

#### *Military Implications:*

[Similar to previous on the same issue] The state of current and potential weaponizable chemicals and of chemical plants should continue to be reviewed in light of possible violations of the CWC or of eventual amendments to the CWC. Those with responsibilities in this area should consider assessing national and international opportunities for assisting in compliance and improving efficiency of the CWC regulations.

#### *Sources:*

Chemical weapons still causing concern

<http://www.newscientisttech.com/channel/tech/mg19426014.700?DCMP=NLC-nletter&nsref=mg19426014.700>

Chlorine bombs pose new terror risk

[http://www.usatoday.com/news/washington/2007-04-23-chlorine-truck-bomb\\_N.htm](http://www.usatoday.com/news/washington/2007-04-23-chlorine-truck-bomb_N.htm)

New chemical rules spark controversy

<http://www.sanluisobispo.com/353/story/23958.html>

### **SIPRI Year Book 2007 Points out Environmental, Nuclear, and Energy Threats**

#### *Military Implications:*

The report's recommendations should be considered for improving compliance and international treaties enforcement, as well as developing international regulations to cover new types of threats.

#### *Sources:*

SIPRI Yearbook 2007

<http://yearbook2007.sipri.org/>

SIPRI Warns of Growing Nuclear Risks

[http://www.nti.org/d\\_newswire/issues/2007\\_6\\_12.html#7DADDB8B](http://www.nti.org/d_newswire/issues/2007_6_12.html#7DADDB8B)

### **Scientific Community's Questions Concerning Biodefense Standards**

#### *Military Implications:*

Although the panel focused on the U.S., the problem is of international concern. Relevant military personnel should consider the outcomes of this panel's discussions along with other material on biosafety and advance the issue at the concerned forums to accelerate the adoption of international standards for the biodefense industry and related activities.

*Source:*

The Need for Biodefense Standards

<http://www.the-scientist.com/article/display/24075/> (by subscription only)

Expert Panel on the Development of Standards for Biodefense

<http://www.biodefensestandards.org/>

## **ETC Report Warns of the Threat of Synthetic Biology and Calls for Global Regulations**

### *Military Implications*

Relevant military personnel covering synthetic biology should consider reviewing the report for insights on social and safety implications. Also, since ETC Group reports are widely read and the group is taking its findings to international forums, it is likely that—along with other such recommendations from different sources—some international organization and regulations for synthetic biology might emerge. The military should consider collaborating in the establishment of international safety standards, and anticipate potential regulations in the planning of future R&D in these areas.

*Sources:*

Extreme Genetic Engineering: An Introduction to Synthetic Biology

<http://www.etcgroup.org/upload/publication/602/01/synbioreportweb.pdf>

Extreme Genetic Engineering: ETC Group Releases Report on Synthetic Biology

<http://www.etcgroup.org/en/materials/publications.html?id=602>

SYN BIOLOGY An Analysis of Synthetic Biology Research in Europe and North America Final Report on Analysis of Synthetic Biology Sector

<http://www2.spi.pt/synbiology/documents/news/D8%20-%20Synthetic%20Biology%20Research%20Assessment.pdf>

## **Russia's Floating Nuclear Plants Pose International Security Risk**

### *Military Implication*

Mobile nuclear reactors could be vulnerable to both natural disasters such as tsunamis and potential attacks/hijacks by terrorists. Since 12 countries including China, Indonesia, Malaysia, Algeria and Argentina have already been listed as potential buyers, the military should start exploring possible responses if an accident or attack were to occur outside of Russian waters. Note: since the U.S. Corps of Engineers operated the Sturgis, a “nuclear barge” facility in a re-used Liberty ship for many years, the U.S. has some experience with the basic concept and its security aspects.

*Source:*

Floating nuclear power stations raise spectre of Chernobyl at sea

<http://www.timesonline.co.uk/tol/news/world/europe/article1662889.ece>

## **Proceedings of the Workshop ‘Risk, Uncertainty and Decision Analysis for Environmental Security and Non-chemical Stressors’**

### *Military Implications:*

Military personnel concerned with risk assessment related to the environment should consider contacting their colleagues who are members of the Organizing Committee to get the proceedings or conclusions and recommendations generated by the workshop.

*Source:*

Risk, Uncertainty and Decision Analysis for Environmental Security and Non-chemical Stressors  
<http://www.risk-trace.com/portugal/index.php>

## **Pandemics**

### **Proposed Global Early Warning System for Monitoring Pandemics**

*Military Implications:*

The military should consider contributing to the study, seeking liaison with systems to distinguish between biological warfare and more naturally occurring phenomena, and/or procedures for coordination with the early warning system.

*Sources:*

Origins of major human infectious diseases. Nature 447, 279-283 (17 May 2007)

<http://www.nature.com/nature/journal/v447/n7142/full/nature05775.html#abs> (by subscription only)

Scientists: Early warning system for disease needed

<http://www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=3623&language=1>

Fifty-ninth World Health Assembly

<http://www.who.int/mediacentre/events/2006/wha59/en/index.html>

### **FAO Launched New Crisis Management Centre**

#### **WHO-sponsored pandemic flu task force holds first meeting in Geneva**

*Military Implications:*

[Similar to previous on the same issue] The military should continue collaboration with these centers to strengthen military-to-military assistance and training in fighting pandemics, to become more globally integrated and for assisting in planning and performing emergency actions, if needed.

*Sources:*

New Crisis Management Centre launched by FAO

<http://www.fao.org/newsroom/en/news/2006/1000421/index.html>

WHO-sponsored pandemic flu task force holds first meeting in Geneva

[http://www.iht.com/articles/ap/2006/09/26/europe/EU\\_MED\\_UN\\_Pandemic\\_Task\\_Force.php](http://www.iht.com/articles/ap/2006/09/26/europe/EU_MED_UN_Pandemic_Task_Force.php)

## **Potential Health Threats Of Some New Technologies**



## **Nanotechnology**

### Grand Challenges for Nanotechnology

### UK to Have New Nanotechnology Risk Information Service

### Risks of Nanotechnology Applications

### Berkeley, California, Considering Nanoparticle Health and Safety Law

#### *Military Implications*

Relevant military personnel should consider these new information resources for inputs to their own nanotech research and applications.

#### *Sources:*

Five-step check for nano safety

<http://news.bbc.co.uk/2/hi/science/nature/6153814.stm>

Nature report proposes nanotech safety strategy

[http://www.smalltimes.com/display\\_article/277298/109/ARTCL/none/none/Nature\\_report\\_proposes\\_nanotech\\_safety\\_strategy](http://www.smalltimes.com/display_article/277298/109/ARTCL/none/none/Nature_report_proposes_nanotech_safety_strategy)

Berkeley considering need for nano safety

<http://www.sfgate.com/cgi-bin/article.cgi?file=/c/a/2006/11/24/MNGP9MJ4K11.DTL>

Safe handling of nanotechnology. Nature 444, 267-269. Published online 15 November 2006 (by subscription only)

IOM's SAFEnano Initiative announced as DTI's newest Nanotechnology Centre

[http://www.iom-world.org/news/nanotech\\_centre.php](http://www.iom-world.org/news/nanotech_centre.php)

Risks in architectural applications of nanotechnology

<http://www.nanowerk.com/spotlight/spotid=1007.php>

### Carbon Nanotubes May Spread in Water More Widely Than Thought

#### *Military Implications:*

The military should investigate these results to see whether previous assessments of risk for carbon nanotubes in aqueous environments need to be modified, and should take them into account in future studies and use of nanotubes.

#### *Source:*

Carbon nanomaterials may disperse more widely in waterways

<http://www.physorg.com/news84458690.html>

### Scientists Correlate Nanoparticle Structure and Toxicity

### Australian New Report and Research Group on Nanotechnology

#### *Military Implications:*

The military should follow these efforts and use the results to aid in environmental risk assessment and health education for new nanomaterials.

#### *Sources:*

Nanotoxicology: Signs of stress

<http://www.nature.com/nnano/journal/v1/n1/full/nnano.2006.69.html>

Options for a National Nanotechnology Strategy Report

<http://www.industry.gov.au/content/itrinternet/cmscontent.cfm?objectID=E2FE4F8A-4E44-4785-A6A01BE137E0E524>

NanoSafe Australia Newsletter

<http://cohesion.rice.edu/CentersAndInst/ICON/emplibary/NanoSafeAustNewsletter1-Aug2006.pdf>

Nanotechnology - it's a small, small world

<http://www.smh.com.au/news/science/nanotechnology--its-a-small-small-world/2006/10/04/1159641392822.html>

### Nanomaterials Handbook

#### *Military Implications:*

Military personnel with an interest in nanotech and related subjects might find this handbook useful due to its broad perspectives on the domain.

#### *Sources:*

Nanomaterials Handbook. Yury Gogotsi, Drexel University, Philadelphia, Pennsylvania

[http://www.crcpress.com/shopping\\_cart/products/product\\_detail.asp?sku=2308&pc=/shopping\\_cart/categories/categories\\_products.asp?parent\\_id=1174](http://www.crcpress.com/shopping_cart/products/product_detail.asp?sku=2308&pc=/shopping_cart/categories/categories_products.asp?parent_id=1174)

Book Review: <http://www.nature.com/nnano/journal/v1/n1/full/nnano.2006.64.html>

### Characterising the potential risks posed by engineered nanoparticles

#### Review of Safety Practices in the Nanotechnology Industry

#### *Military Implications:*

Military personnel concerned with nanotech safety should review these reports for insights on nanotech environmental risk assessment.

#### *Sources:*

Characterising the potential risks posed by engineered nanoparticles

<http://www.defra.gov.uk/environment/nanotech/research/reports/progress-report061019.pdf>

A Review of Safety Practices in the Nanotechnology Industry - Phase One Report

[http://cohesion.rice.edu/CentersAndInst/ICON/emplibary/Phase%20I%20Report\\_UCSB\\_ICON%20Final.pdf](http://cohesion.rice.edu/CentersAndInst/ICON/emplibary/Phase%20I%20Report_UCSB_ICON%20Final.pdf)

Press release: [www.icon.rice.edu](http://www.icon.rice.edu)

### Data Base for Nano Environmental Health and Safety

#### Major German Study on Nanotech in Food Industry

#### Nanotube Toxicity Tests Unreliable

#### Inhaled Nanoparticles May Have Easy Path to Brain

#### Cleanup and Other Nanomaterials May Re-release Pollutants

#### *Military Implications:*

Relevant military personnel should follow the progress of these new discoveries in order to improve their own nanotech risk assessment processes, analytical procedures and materiel development programs.

#### *Sources:*

ICON database: <http://icon.rice.edu/research.cfm>

Experts and consumers convene on nano risks

<http://www.foodproductiondaily.com/news/ng.asp?n=70058-nanotechnology-bfr-toxicity>

Carbon-Nanotube Toxicity Test Tricks Scientists

<http://www.physorg.com/news76672397.html>

Tiny inhaled particles take easy route from nose to brain

<http://www.urmc.rochester.edu/pr/news/story.cfm?id=1191>

The Flip Side of Using Carbon Nanotubes for Environmental Pollutants Removal

<http://www.nanowerk.com/spotlight/spotid=780.php>

### Increased Research Needed to Address Environmental, Health, and Security Issues Related to Nanotechnology

Nanotechnology and the Food and Agriculture Sector

Reaction to Voluntary Nanomaterial Reporting Scheme

FDA Forms Internal Nanotechnology Task Force

European Commission Opens Nano2Life Network

*Military Implications:*

Relevant military personnel should study these reports for inputs in improving understanding of risk assessment and management of nanomaterials, as well as to prepare for eventual new safety regulations.

*Sources:*

Nanotechnology report urges better safety standards

<http://www.the-scientist.com/news/daily/24910/> (by subscription only)

A Matter of Size: Triennial Review of the National Nanotechnology Initiative

<http://www.nap.edu/catalog/11752.html>

Environmental, Health, and Safety Research Needs for Engineered Nanoscale Materials report

[http://www.nano.gov/NNI\\_EHS\\_research\\_needs.pdf](http://www.nano.gov/NNI_EHS_research_needs.pdf)

Report and data base: <http://www.nanotechproject.org/50>

<http://biz.yahoo.com/prnews/060907/dcw073a.html?v=1>

Defra Consultation on a Voluntary Reporting Scheme for Engineered Nanoscale Materials:

Summary of Findings and Government's Response, August 2006

FDA Forms Internal Nanotechnology Task Force

<http://www.fda.gov/bbs/topics/NEWS/2006/NEW01426.html>

Nano2Life [www.nano2life.org](http://www.nano2life.org)

### Chinese and Russian New Nanotechnology Organizations

*Military Implications:*

Military liaisons in Russia and China should establish contact with these institutions, to exchange information on nanotechnology and related environmental security issues.

*Sources:*

Laboratory for Biological Effects of Nanomaterials and Nanosafety Established in China

<http://www.azonano.com/news.asp?newsID=2507>

Russia opens new nanotech center

<http://www.eetimes.com/news/semi/showArticle.jhtml?articleID=190400109>

### UK Nanotechnology Policy Review Announced

*Military Implications:*

Military environmental representatives in the UK should follow the progress of this effort and review the Council's report when it comes out, as its findings are very likely to have an impact on future UK internal policies and international regulatory negotiations.

*Source:*

UK. Nanotechnology Policy Review Announced

<http://www.bymnews.com/new/content/view/31988/82/>

UK Review Faults Governments' Nanotech Risk Assessment Plans

Nanomaterials' Biological Risks a Complex Problem

Online Consultation on Nanomaterials Specification in EU Technical Guidance for Chemicals

Swiss Firm Offers Nanotech Risk Assessment Data and Safety Certification

*Military Implications*

[Same as previous on similar issues] Relevant military personnel should review information generated by these assessments on nanotech environmental health and safety to improve military and contractor practices, as well as to assist and cooperate with the organizations working on those issues for enriching their studies.

Sources:

Nanosciences and Nanotechnologies: A Review of Government's Progress on its Policy Commitments [http://www.cst.gov.uk/cst/news/Files/nano\\_review.pdf](http://www.cst.gov.uk/cst/news/Files/nano_review.pdf)

Calls for More Research (sic) into Potential Risks of Nanotechnology

<http://www.azonano.com/news.asp?newsID=3912>

When It Comes to Risk, Not All Nanomaterials Are Created Equal

[http://news.rpi.edu/update.do?artcenterkey=2038&setappvar=page\(1\)](http://news.rpi.edu/update.do?artcenterkey=2038&setappvar=page(1))

When It Comes To Risk, Not All Nanomaterials Are Created Equal

<http://www.sciencedaily.com/releases/2007/03/070326095826.htm>

Public consultation on SCENIHR Opinion on The appropriateness of the risk assessment methodology in accordance with the Technical Guidance Documents for new and existing substances for assessing the risks of nanomaterials

[http://ec.europa.eu/health/ph\\_risk/committees/04\\_scenihhr/scenihhr\\_cons\\_04\\_en.htm](http://ec.europa.eu/health/ph_risk/committees/04_scenihhr/scenihhr_cons_04_en.htm)

World's first nanospecific safety label

<http://www.in-pharmatechnologist.com/news/ng.asp?n=74792-the-innovation-society-cenarios-nanotechnology-safety-drug-delivery>

CENARIOS® - Managing Nano Risks

[http://www.innovationgesellschaft.ch/images/publikationen/Factsheet\\_CENARIOS\\_english\\_aria2.pdf](http://www.innovationgesellschaft.ch/images/publikationen/Factsheet_CENARIOS_english_aria2.pdf)

UN Environment Programme Calls for Nanotech Safeguards

Survey Gives Insight into Effective Nanotech Education Methods

French Research Council to Study Nanotube Toxicity

Tighter controls needed for nanotechnology, says UN report

[http://www.technologyreview.com/read\\_article.aspx?id=18144&ch=nanotech](http://www.technologyreview.com/read_article.aspx?id=18144&ch=nanotech)

GEO Year Book 2007

<http://www.unep.org/geo/yearbook/yb2007/>

Nanotechnology and the public: Effectively communicating nanoscale science and engineering concepts

<http://springerlink.metapress.com/content/u276420455825217/?p=04e798d9a2d44481907da0176313de28&pi=0>

Study points way to communicating nanotech

<http://www.news.wisc.edu/13391.html>

Multiple Benefits of Nanotechnology Encourages Widespread Uptake in Water and Wastewater Treatment

[http://home.businesswire.com/portal/site/google/index.jsp?ndmViewId=news\\_view&newsId=20070201005476&newsLang=en](http://home.businesswire.com/portal/site/google/index.jsp?ndmViewId=news_view&newsId=20070201005476&newsLang=en)

New study to assess toxicity of carbon nanotubes

<http://nanotechweb.org/articles/news/6/1/9/1>

European Guide to Green Masters Programs Launched.

Toxic Metals Carried into Cells by Nanoparticles

Source: Institute of Nanotechnology Nano Masters Course Directory

<http://www.nano.org.uk/nanomasters/>

A nano Trojan horse

[http://pubs.acs.org/subscribe/journals/esthag-w/2007/apr/science/lt\\_nano.html](http://pubs.acs.org/subscribe/journals/esthag-w/2007/apr/science/lt_nano.html)

## **Reports Addressing Nanotechnology Safety**

*Military Implications:*

Military personnel concerned with nanotech safety and regulation of environmental hazards from nanomaterials should consider reviewing these reports for insights on nanotech environmental risk assessment.

*Sources:*

Assessing exposure to airborne nanomaterials: Current abilities and future requirements.

<http://www.informaworld.com/smpp/content~content=a776419006~db=all~order=page>

Nanotoxicology <http://www.informaworld.com/smpp/title~content=t716100760>

New methods and tools needed to measure exposure to airborne nanomaterials

<http://www.physorg.com/news96032587.html>

Nanotech Standards Workshop Report Released

An Issues Landscape For Nanotechnology Standards: Report of a Workshop

<http://ifas.msu.edu/NSWorkshopReport.pdf>

Nanotech Products Meeting to Be Held in London, 16-17 May—updated information is now available at [www.nano.org.uk/events/ionevents.htm](http://www.nano.org.uk/events/ionevents.htm)

A Review of Current Practices in the Nanotechnology Industry

<http://cohesion.rice.edu/CentersAndInst/ICON/emplibrary/ICONNanotechSurveyFullReduced.pdf>

ICON website <http://icon.rice.edu>

RCRA Regulations of Wastes from the Production, Use, and Disposal of Nanomaterials

Report: <http://www.abanet.org/enviro/nanotech/pdf/RCRA.pdf>

Technical Proceedings of the 2006 NSTI Nanotechnology Conference and Trade Show, Volume 1 Chapter 6: Environmental, Health and Societal Impacts of Nanotechnology. A Framework for Responsible Nanotechnology Standards

<http://nsti.org/procs/Nanotech2006v1/6/W37.06>

*Nanotechnology: A Research Strategy for Addressing Risk*

<http://www.nanotechproject.org/67/7-19-06-nanotechnology-a-research-strategy-for-addressing-risk>  
 A scoping study to identify gaps in environmental regulation for the products and applications of nanotechnologies  
[http://www.defra.gov.uk/science/project\\_data/DocumentLibrary/CB01075/CB01075\\_3373\\_FRP.doc](http://www.defra.gov.uk/science/project_data/DocumentLibrary/CB01075/CB01075_3373_FRP.doc)  
*Nanotechnology Risk Governance*  
[http://www.irgc.org/irgc/b/contentFiles/IRGC\\_white\\_paper\\_2\\_PDF\\_final\\_version.pdf](http://www.irgc.org/irgc/b/contentFiles/IRGC_white_paper_2_PDF_final_version.pdf)  
*The Ethics and Politics of Nanotechnology*  
 Report: <http://unesdoc.unesco.org/images/0014/001459/145951e.pdf>  
 SCIENTIFIC COMMITTEE ON EMERGING AND NEWLY IDENTIFIED HEALTH RISKS (SCENIHR) modified Opinion (after public consultation) on The appropriateness of existing methodologies to assess the potential risks associated with engineered and adventitious products of nanotechnologies  
[http://ec.europa.eu/health/ph\\_risk/committees/04\\_scenihhr/docs/scenihhr\\_o\\_003b.pdf](http://ec.europa.eu/health/ph_risk/committees/04_scenihhr/docs/scenihhr_o_003b.pdf)  
 NIOSH Update: NIOSH Releases Nanotechnology Research Progress Report  
<http://www.cdc.gov/niosh/updates/upd-02-27-07.html>  
 Progress Toward Safe Nanotechnology in the Workplace (NIOSH Publication No. 2007-123)  
<http://www.cdc.gov/niosh/docs/2007-123>  
 Understanding Risk Assessment of Nanotechnology  
[http://nano.gov/pdf/Understanding\\_Risk\\_Assessment.pdf](http://nano.gov/pdf/Understanding_Risk_Assessment.pdf)  
 Industry should become familiar with EPA white paper on nanotechnology  
<http://www.nanowerk.com/news/newsid=1512.php>  
 U.S. Environmental Protection Agency Nanotechnology White Paper (EPA 100/B-07/001)  
<http://www.epa.gov/osa/pdfs/nanotech/epa-nanotechnology-white-paper-final-february-2007.pdf>  
 Nano coalition launches virtual journal on risk research  
[http://www.eurekalert.org/pub\\_releases/2007-03/ru-ncl032207.php](http://www.eurekalert.org/pub_releases/2007-03/ru-ncl032207.php)  
*Green Nanotechnology: It's Easier Than You Think*  
<http://www.nanotechproject.org/116/4262007-green-nanotechnology-its-easier-than-you-think>  
 Nanotechnology Provides Green Path To Environmentally Sustainable Economy  
[http://www.spacemart.com/reports/Nanotechnology\\_Provides\\_Green\\_Path\\_To\\_Environmentally\\_Sustainable\\_Economy\\_999.html](http://www.spacemart.com/reports/Nanotechnology_Provides_Green_Path_To_Environmentally_Sustainable_Economy_999.html)

### **Conferences on Nanotechnology with Environmental Security Implications**

#### *Military Implications:*

Appropriate military personnel should consider attending or obtaining the proceedings of these meetings for possible input to their own work.

#### *Sources:*

Public Meeting on Research Needs and Priorities Related to the Environmental, Health, and Safety Aspects of Engineered Nanoscale Materials

[https://nnco.nano.gov/public\\_ehs/](https://nnco.nano.gov/public_ehs/)

Nanotechnology - Products and Processes for Environmental Benefit

<http://www.nano.org.uk>

Success and Outcomes from the Finnish Presidency Conference on “Nanotechnologies – Safety for Success”

[http://www.fmmt.fi/ntss/FIN\\_Presidency\\_Nanotechnologies\\_report.pdf](http://www.fmmt.fi/ntss/FIN_Presidency_Nanotechnologies_report.pdf)

'Nanotechnology for Security and Crime Prevention', email

Health & Environment Summit on Nano” at Nanotech 2007

[http://home.businesswire.com/portal/site/google/index.jsp?ndmViewId=news\\_view&newsId=20061026005829&newsLang=en](http://home.businesswire.com/portal/site/google/index.jsp?ndmViewId=news_view&newsId=20061026005829&newsLang=en)

4th NanoSpain Workshop <http://www.nanospain.org/Workshop4>

Finland Conference site: <http://www.fmmt.fi/ntss>

Egypt Conference site: <http://www.nanoinsight.net>

Safety of Manufactured Nanomaterials

[http://www.oecd.org/departement/0,2688,en\\_2649\\_37015404\\_1\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/departement/0,2688,en_2649_37015404_1_1_1_1_1,00.html)

## **Growing Health Concerns over Electromagnetic Fields Might Trigger New Regulations**

### Warnings on Possible Wi-Fi Dangers

#### Potential Magnetic Fields Regulations in Japan

##### *Military Implications:*

Research for determining the possible impact of electromagnetic fields and electronic smog on human health and the environment is increasing. The military, in addition to closely following the scientific research, should be investigating what steps would need to be taken, if the fears prove well founded, and such devices become the subject of restrictive regulations. Future soldier support developments, not only in communication, but in such areas as robot-assist, weapon targeting, hostile fire tracking, battlefield monitoring, and personal physiological monitoring will add to the fog of electromagnetic fields on and within soldiers' bodies and should be assessed in totality for possible additive and synergistic health impacts.

##### *Sources:*

Hi-tech horrors [http://comment.independent.co.uk/leading\\_articles/article2472074.ece](http://comment.independent.co.uk/leading_articles/article2472074.ece)

Danger on the airwaves: Is the Wi-Fi revolution a health time bomb?

[http://news.independent.co.uk/uk/health\\_medical/article2472140.ece](http://news.independent.co.uk/uk/health_medical/article2472140.ece)

Apiculture world abuzz over theory that cellphone radiation may be killing bees

<http://www.canada.com/topics/technology/news/gizmos/story.html?id=4734ad59-f543-4ac5-ae34-d33431e59be2&k=74835>

Industry ministry to regulate magnetic fields

<http://www.asahi.com/english/Herald-asahi/TKY200704260232.html> (article not available anymore on the website)

Power lines in new link to childhood leukaemia

<http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2007/04/21/nleuk21.xml>

## **Sonar**

### The Debate over Use of Sonar by the Navy Continues; Legal Settlement Approved

##### *Military Implications:*

As pointed out by Joel Reynolds, a senior attorney at the Natural Resources Defense Council (NRDC) and director of its Marine Mammal Protection Project, "this settlement confirms that measures to protect our oceans can and must be part of the Navy's training for submarine defense." Although this time a settlement was reached, it is likely that at some point, in case of more evidence that sonars are harmful, or more pressure from conservation groups, they might



be banned completely. In any event, monitoring of marine mammals' presence in case of sonar use should become incorporated in Navy policy.

*Sources:*

Court Allows Sonar in RIMPAC War Games With New Restrictions

<http://www.ens-newswire.com/ens/jul2006/2006-07-09-01.asp>

### U.S. to Study Sonar Impact on Marine Mammals

*Military Implications:*

The military should follow the research and fully cooperate to make sure that the results will be the most conclusive possible. In the meantime, in view of growing public concerns, it should cooperate with environmental groups to ensure that its exercises do not affect the marine life.

*Sources:*

Military R&D worth \$72M

<http://www.honoluluadvertiser.com/apps/pbcs.dll/article?AID=/20070526/NEWS08/705260353/1018/NEWS>

Navy Disappointed with Sonar Lawsuit

<http://www.military.com/features/0,15240,136479,00.html>

Navy sued over sonar testing off Hawaii

<http://www.msnbc.msn.com/id/18721001/>

## **POLLUTION ISSUES**

### **World Health Organization: Stress Environmental Impact on Human Health**

*Military Implications:*

Military health and planning personnel should consider their Area of Responsibility countries' health profiles as a tool for improving living and health standards of the local population and estimating social instability, as well as for protecting U.S. troops from risks. Although it is not likely that the WHO research would trigger any legally binding regulations, the use of these countries' profiles might generate national and regional environmental health policies.

*Sources:*

New country-by-country data show in detail the impact of environmental factors on health

<http://www.who.int/mediacentre/news/releases/2007/pr30/en/index.html>

### **New Predictions for the Atmosphere by 2030**

*Military Implications:*

Since these scenarios help identify and understand gaps in current legislation, they may also become the basis for new international regulations and technological applications affecting the military.

*Source:*

New Predictions for the Global Atmospheric Environment by 2030

<http://ec.europa.eu/environment/integration/newsalert/pdf/37na4.pdf>

## **China's ASAT Test Created Serious Long-Range Low-Earth Orbital Pollution**

### *Military implications:*

Although military-to-military cooperation with China has been damaged by the ASAT test, it does offer an opportunity to explore joint research programs to reduce current space debris. In any case, the military should increase R&D to collect debris and improve modeling software to monitor and predict in greater detail, in addition to programs to harden satellites and space craft.

### *Sources:*

Debris from China's Kinetic Energy ASAT Test

[http://www.ucsusa.org/global\\_security/space\\_weapons/debris-from-chinas-asat-test.html](http://www.ucsusa.org/global_security/space_weapons/debris-from-chinas-asat-test.html)

China's Anti-Satellite Test: Worrisome Debris Cloud Circles Earth

[http://www.space.com/news/070202\\_china\\_spacedebris.html](http://www.space.com/news/070202_china_spacedebris.html)

NASA Orbital Debris Program Office

<http://orbitaldebris.jsc.nasa.gov>

Space debris spotlight

[http://www.esa.int/esaCP/SEMHDJXJD1E\\_FeatureWeek\\_0.html](http://www.esa.int/esaCP/SEMHDJXJD1E_FeatureWeek_0.html)

United Nations Office for Outer Space Affairs (UNOOSA) <http://www.unoosa.org>

Inter-Agency Space Debris Coordination Committee <http://www.iadc-online.org>

## **Polluted Skies and Global Warming Puzzle Decoded**

### *Military Implications:*

This new discovery might increase attention to different pollutants, and consequently change or trigger new regulations globally or by region, pending on weather patterns. Also, since weather conditions (floods, drought, and related consequences) are increasingly incorporated in human security strategies, the new findings might be useful to military activities relying on rain patterns.

### *Sources:*

Polluted Skies and Global Warming Puzzle Decoded

<http://www.ens-newswire.com/ens/jul2006/2006-07-14-01.asp>

Air Pollution's Color Determines Its Effect On Clouds

<http://www.jyi.org/news/nb.php?id=745>

## **European New Web-based Air Pollution Monitoring System**

### *Military Implications:*

Considering the increased role of citizens in shaping Europe's regulations, it is reasonable to speculate that such Web-based information accompanied by health implications related to air pollution might trigger requests for even more stringent regulations on pollutants across Europe. The impacts of military bases could be made more evident and objective with such a system than has been true in the past.

### *Sources:*

New web-based air pollution monitoring system

<http://org.eea.europa.eu/documents/newsreleases/Ozone2006-en>

The Ozone Web

<http://www.eea.europa.eu/maps/ozone/welcome>

## **Ozone Hole Worst Ever Recorded**

### **Mission to Study Arctic Environmental Changes**

#### *Military Implications:*

There is compelling evidence of the consequences of anthropogenic climate change, and a growing world demand for action. The military should continue to accelerate efforts to reduce their own greenhouse gas emissions. New international environmental security-related policies and cooperation to avoid potentially large-scale disasters and conflicts seem inevitable.

#### *Sources:*

Antarctic ozone hole is worst ever recorded, UN reports

<http://www.un.org/apps/news/story.asp?NewsID=20108&Cr=Ozone&Cr1=>

Record ozone loss during 2006 over South Pole

[http://www.esa.int/esaCP/SEMQBOKKKSE\\_index\\_0.html](http://www.esa.int/esaCP/SEMQBOKKKSE_index_0.html)

Ozone Depletion Crisis Not Yet Over

<http://www.ens-newswire.com/ens/oct2006/2006-10-27-08.asp>

UNEP Ozone Secretariat

[http://ozone.unep.org/Treaties\\_and\\_Ratification/index.asp](http://ozone.unep.org/Treaties_and_Ratification/index.asp)

Swiss Map Permafrost After Signs Alps Crumbling

<http://www.planetark.com/dailynewsstory.cfm/newsid/37442/story.htm>

Global Warming Puts 12 US Parks at Risk – Report

<http://www.planetark.com/dailynewsstory.cfm/newsid/37391/story.htm>

## **Burning Fossil Fuels Acidifies Oceans, Erodes Coral Reefs**

#### *Military Implications:*

Citing the Army's "Strategy for the Environment," the military should seek new opportunities to participate in dialogues among scientists, politicians, environmental NGOs, and economic decision-makers for improving biodiversity management strategies, as well as in planning its own operations.

#### *Sources:*

Report Warns about Carbon Dioxide Threats to Marine Life

<http://www.ucar.edu/news/releases/2006/acidification.shtml>

UN supports two-year expedition probing Arctic climate change

<http://www.un.org/apps/news/story.asp?NewsID=19156&Cr=UNEP&Cr1=>

## **New Research Finds Human Energy Usage is a Long-Term Heating Problem Independent of Greenhouse Gases and Solar Radiation**

#### *Military implications:*

Long range military R&D should find and explore ways to use energy sources and applications that generate little heat.

#### *Source:*

Energy, Ethics, and the Far Future DRAFT #2 by Eric J. Chaisson

## **Accelerating Environmental Health Crises in China**

#### *Military Implications:*

Since future environmental migrations could lead to internal conflicts, and since China is about 20% of the world, alternative forecasts and plans for how to address potential instabilities in China should be explored. In the meantime, China is increasing pressure (as previously cited in these monthly reports) on its military to take the environment into account in all its activities. Hence, there are opportunities for military-to-military cooperation with the China Environmental Health Project (partially supported by the U.S. Agency for International Development) to encourage research and training projects focused on finding solutions to safe drinking water and reducing pollution in China.

*Sources:*

A Troubled River Mirrors China's Path to Modernity. New York Times, November 19, 2006  
<http://www.nytimes.com/2006/11/19/world/asia/19yellowriver.html?ex=1321592400&en=8c861ff8995a67dd&ei=5088&partner=rssnyt&emc=rss>  
Environmental Health Crises in Southwest China (WWIC conference video archived)  
[http://www.wilsoncenter.org/index.cfm?fuseaction=events.event\\_summary&event\\_id=206921#](http://www.wilsoncenter.org/index.cfm?fuseaction=events.event_summary&event_id=206921#)  
China to Pass U.S. in 2009 in Emissions  
[http://www.stopglobalwarming.org/sgw\\_read.asp?id=4393611102006](http://www.stopglobalwarming.org/sgw_read.asp?id=4393611102006)  
Beijingers told to stay indoors as smog hangs, China Daily (November 20, 2006)  
[http://www.chinadaily.com.cn/china/2006-11/20/content\\_738054.htm](http://www.chinadaily.com.cn/china/2006-11/20/content_738054.htm)  
World Energy Outlook 2006, International Energy Agency  
<http://www.iea.org/w/bookshop/add.aspx?id=279>

## **CLIMATE CHANGE**

### **New Scientific Evidence Mitigation of Climate Change**

*Military Implications:*

Extreme weather conditions, threats to food supply, and loss of livelihood (mostly in highly populated regions such as India and China) might increase unrest and threaten global stability. The U.S. Army Corps of Engineers—having the logistics and know-how—should consider worldwide collaboration with counterparts and international organizations (e.g. the UNU Institute for Environment and Human Security in Bonn) to determine priorities on which communities need what kind of help from a network of state and international agencies. Also, the issue of environmental refugees should be tackled swiftly to avoid conflicts that this rising segment of world population might cause.

*Sources:*

Climate Change 2007: The Physical Science Basis (Summary for Policymakers)  
<http://www.ipcc.ch/SPM2feb07.pdf>  
UN officials urge global push to reverse environmental damage  
<http://www.un.org/apps/news/story.asp?NewsID=21440&Cr=climate&Cr1=change>  
Evidence is now 'unequivocal' that humans are causing global warming – UN report  
<http://www.un.org/apps/news/story.asp?NewsID=21429&Cr=climate&Cr1=change>  
Global Warming May Explain India's Extreme Storm Rise -- (AFP -- November 30, 2006)  
[http://www.terraviva.com/reports/Global\\_Warming\\_May\\_Explains\\_India\\_Extreme\\_Storm\\_Rise\\_999.html](http://www.terraviva.com/reports/Global_Warming_May_Explains_India_Extreme_Storm_Rise_999.html)

WMO Statement on the Status of the global Climate in 2006  
[http://www.wmo.ch/web/Press/PR\\_768\\_English.doc](http://www.wmo.ch/web/Press/PR_768_English.doc)

Europe's warmest autumn in 500 years  
<http://www.bioedonline.org/news/news.cfm?art=2978>

Australia ponders climate future  
<http://news.bbc.co.uk/2/hi/science/nature/6204141.stm>

Satellites weigh Africa's water  
<http://news.bbc.co.uk/2/hi/science/nature/6174689.stm>

Climate Change Melts Kilimanjaro's Snows  
<http://www.washingtonpost.com/wp-dyn/content/article/2006/12/16/AR2006121600431.html>

Tibet: Disappearing Glaciers Threaten China, UN Says  
<http://www.unpo.org/article.php?id=5838>

Tibet's Disappearing Glaciers Threaten China -- (Bloomberg -- November 14, 2006)  
[http://www.bloomberg.com/apps/news?pid=20601086&sid=as.VsLN0AqhA&refer=latin\\_america](http://www.bloomberg.com/apps/news?pid=20601086&sid=as.VsLN0AqhA&refer=latin_america)

Ministry of Science and Technology's Web site [www.most.gov.cn](http://www.most.gov.cn)

World 'warmest for 12,000 years'  
<http://news.bbc.co.uk/2/hi/science/nature/5381456.stm>

Global temperature change  
<http://www.pnas.org/cgi/content/full/103/39/14288>

Human Activities Are Boosting Ocean Temperatures in Areas Where Hurricanes Form, New Study Finds  
<http://www.ucar.edu/news/releases/2006/oceantemps.shtml>

Study Strengthens Link Between Global Warming, Fiercer Storms  
<http://www.ens-newswire.com/ens/sep2006/2006-09-12-02.asp>

Deep ice tells long climate story  
<http://news.bbc.co.uk/2/hi/science/nature/5314592.stm>

Overview of current sea ice conditions  
[http://nsidc.org/news/press/2006\\_seaiceminimum/20060816\\_arcticseaicenews.html](http://nsidc.org/news/press/2006_seaiceminimum/20060816_arcticseaicenews.html)

Melting Greenland Ice Sheet Spells More Bad News On Climate Change  
[http://www.terraily.com/reports/Melting\\_Greenland\\_Ice\\_Sheet\\_Spells\\_More\\_Bad\\_News\\_On\\_Climate\\_Change\\_999.html](http://www.terraily.com/reports/Melting_Greenland_Ice_Sheet_Spells_More_Bad_News_On_Climate_Change_999.html)

Melting glaciers in southeast Alaska have scientists worried  
[http://www.mailtribune.com/archive/2006/0922/life/stories/melting\\_glaciers.htm](http://www.mailtribune.com/archive/2006/0922/life/stories/melting_glaciers.htm)

Arctic summer ice anomaly shocks scientists  
[http://www.esa.int/esaEO/SEM7ZF8LURE\\_index\\_0.html](http://www.esa.int/esaEO/SEM7ZF8LURE_index_0.html)

New Evidence Shows Antarctica Has Warmed In Last 150 Years  
[http://www.terraily.com/reports/New\\_Evidence\\_Shows\\_Antarctica\\_Has\\_Warmed\\_In\\_Last\\_150\\_Years\\_999.html](http://www.terraily.com/reports/New_Evidence_Shows_Antarctica_Has_Warmed_In_Last_150_Years_999.html)

Climate 'time bomb' forecast  
[http://www.boston.com/news/nation/articles/2006/09/07/climate\\_time\\_bomb\\_forecast/](http://www.boston.com/news/nation/articles/2006/09/07/climate_time_bomb_forecast/) (article available free for a limited time)

Scientists find new global warming threat from melting permafrost  
[http://www.usatoday.com/tech/science/discoveries/2006-09-06-permafrost-warming\\_x.htm?POE=TECISVA](http://www.usatoday.com/tech/science/discoveries/2006-09-06-permafrost-warming_x.htm?POE=TECISVA)

Diary: Siberia and climate change  
<http://news.bbc.co.uk/2/hi/science/nature/5323964.stm>

Science tempers fears on climate change

<http://www.theaustralian.news.com.au/story/0,20867,20332352-601,00.html> (article available free for a limited time)

More fires, droughts and floods predicted

<http://www.bristol.ac.uk/news/2006/1053.html>

A climate-change risk analysis for world ecosystems

<http://www.pnas.org/cgi/content/abstract/0601816103v1?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=Marko+Scholze&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT> (Abstract)

Disaster-Prone China Takes Heed of Global Warming

<http://www.planetark.com/dailynewsstory.cfm/newsid/37869/story.htm>

No Dice for Greenland Ice

<http://sciencenow.sciencemag.org/cgi/content/full/2006/810/3>

Greenland ice cap may be melting at triple speed

<http://www.newscientist.com/article/dn9717-greenland-ice-cap-may-be-melting-at-triple-speed.html>

(by subscription only; full text in the [Appendix](#))

Greenland Ice Sheet Is Melting Faster, Study Says

[http://news.nationalgeographic.com/news/2006/08/060810-greenland\\_2.html](http://news.nationalgeographic.com/news/2006/08/060810-greenland_2.html)

Greenland Ice Sheet Is Melting Faster, Study Says

<http://www.cosmosmagazine.com/node/539>

Alaska glacier melt rate a surprise

[http://www.agrnews.org/?section=archives&cat\\_id=39&article\\_id=1056](http://www.agrnews.org/?section=archives&cat_id=39&article_id=1056)

Once-icy Arctic now Great 'Wet' North

<http://www.canada.com/edmontonjournal/news/story.html?id=aa5d2a48-6a62-4bb0-a0fe-0d7ff4cedef3&k=86833>

Hydro-Quebec adjusts rates as air-conditioners appear in north

<http://www.canada.com/montrealgazette/news/story.html?id=1f9bf9a9-0872-4bb0-995c-557894a39854>

In Warmer World, Even Inuit Buy Air Conditioners

<http://www.planetark.com/dailynewsstory.cfm/newsid/37558/story.htm>

Climate change behind summer heat waves?

<http://msnbc.msn.com/id/13993578/>

Earth from Space: A cloudless UK

[http://www.esa.int/esaEO/SEMHAZ715QE\\_index\\_0.html](http://www.esa.int/esaEO/SEMHAZ715QE_index_0.html)

Tuvalu Envoy Takes Up Global Warming Fight

<http://www.npr.org/templates/story/story.php?storyId=10950375>

Global Platform for Disaster Risk Reduction

<http://www.preventionweb.net/globalplatform/>

UN agencies, partners call on wealthy nations to adopt emission targets

<http://www.un.org/apps/news/story.asp?NewsID=22801&Cr=climate&Cr1=change>

One man's battle to hunt down typhoons

[http://news.independent.co.uk/sci\\_tech/article2652805.ece](http://news.independent.co.uk/sci_tech/article2652805.ece)

Beyond Disasters: Creating Opportunities for Peace

[http://www.wilsoncenter.org/index.cfm?fuseaction=events.event&event\\_id=244464#](http://www.wilsoncenter.org/index.cfm?fuseaction=events.event&event_id=244464#) (video)

*Beyond Disasters: Creating Opportunities for Peace*

<http://www.worldwatch.org/node/5111>

Re-thinking Policies to Cope with Desertification

[http://www.inweh.unu.edu/inweh/drylands/IYDD\\_Policy\\_Brief.pdf](http://www.inweh.unu.edu/inweh/drylands/IYDD_Policy_Brief.pdf)

Desertification: Experts Prescribe Global Policy Overhaul to Avoid Looming Mass Migrations

<http://www.unu.edu/media/archives/2007/files/mre29-A-07.pdf>

Australia - the continent that ran dry

<http://environment.newscientist.com/channel/earth/mg19426085.300;jsessionid=CFNDNHPPHLOB>

(by subscription only; full text in this [Appendix](#))

Armed police deliver water to drought-hit Sichuan

<http://www.alertnet.org/thenews/newsdesk/PEK157663.htm>

China Drought Causes Water Shortages for Millions

<http://www.planetark.com/dailynewsstory.cfm/newsid/42773/story.htm>

Mudslides, floods kill nearly 130 in Bangladesh

[http://uk.reuters.com/article/homepageCrisis/idUKSP1987.\\_CH\\_.242020070612](http://uk.reuters.com/article/homepageCrisis/idUKSP1987._CH_.242020070612)

Adapting to Climate Change –Launching a public debate on options for EU Action

<http://ec.europa.eu/environment/climat/pdf/eccp/adapting.pdf>

Surge in carbon levels raises fears of runaway warming

<http://environment.guardian.co.uk/climatechange/story/0,,1994071,00.html?gusrc=rss&feed=1>

2006 Was the Sixth Warmest Year Ever

<http://www.ens-newswire.com/ens/jan2007/2007-01-03-02.asp>

Worldwide Glacier Melting Underlined in Newly Released Data

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=498&ArticleID=5502&l=en>

How global warming will change the face of Europe

<http://www.thisislondon.co.uk/news/article-23381157->

[details/How%20global%20warming%20will%20change%20the%20face%20of%20Europe/article.do](http://www.thisislondon.co.uk/news/article-23381157-details/How%20global%20warming%20will%20change%20the%20face%20of%20Europe/article.do)

2100: A world of wild weather. NewScientist.com news service, 18 January 2007

<http://environment.newscientist.com/article/mg19325874.000?DCMP=NLC-nletter&nsref=mg19325874.000>

EU warns of global climate chaos

<http://www.guardian.co.uk/international/story/0,,1987423,00.html>

Scientists Say Millions Could Flee Rising Seas

<http://www.planetark.org/dailynewsstory.cfm?newsid=38918&newsdate=10-Nov-2006>

Ice-melt isolates remote communities in Canada

<http://www.sciam.com/article.cfm?chanID=sa003&articleID=5E80048377635F2A67E0E5BE24012F09>

Carbon emissions rising faster than ever

<http://www.newscientist.com/article/dn10507-carbon-emissions-rising-faster-than-ever.html>

Global Carbon Project

<http://www.globalcarbonproject.org/>

2,4 degrees Celsius: the North Sea is heating up (original:2,4 degrés : la mer du Nord se réchauffe)

<http://www.lemonde.fr/web/article/0,1-0@2-3228,36-834748@51-816848,0.html> (French)

Diseases appear on rise with temperature

<http://www.physorg.com/news82749082.html>

New forms of insurance against ravages of climate change needed in poor nations – UN

<http://www.un.org/apps/news/story.asp?NewsID=20594&Cr=climate&Cr1=>

Global Warming Poses Health Threats

<http://www.washingtonpost.com/wp-dyn/content/article/2007/02/02/AR2007020201198.html>

(free registration required)



Climate changes and impact on coastal countries. Risk of sea-level rise: High stakes for developing countries

<http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:21215328~pagePK:64165401~piPK:64165026~theSitePK:469382,00.html>

World Bank study: rising sea levels could displace millions of world's poor

<http://www.iht.com/articles/ap/2007/02/13/america/NA-GEN-World-Bank-Global-Warming.php>

Leader of imperiled Maldives issues stark warning on sea level rise

<http://www.iht.com/articles/2007/02/04/news/maldives.php>

Future flood of 'climate refugees' ahead?

<http://www.canada.com/vancouver/news/story.html?id=d6573622-192c-4378-9659-f6cad6f98ede&k=34215>

Tankers may ship water to parched cities of future

<http://sciam.com/article.cfm?chanID=sa003&articleID=291925DDBC6E2D194D0C22D268E0F865>

Tomgram: McKibben, The Real News about Global Warming

<http://tomdispatch.com/index.mhtml?pid=167460>

Global Warming Threatens Double-Trouble for Peru: Shrinking Glaciers and a Water Shortage

<http://www.enn.com/today.html?id=12201>

China prepares to launch climate adaptation plans

<http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MjI4MTM>

An island of natural airborne killers

<http://www.theglobeandmail.com/servlet/story/RTGAM.20070209.wfungalfears0210/BNStory/Front>

Dangerous fungus thrives on West Coast

<http://www.theglobeandmail.com/servlet/story/RTGAM.20070209.wfungus0210/BNStory/ClimateChange/home>

Global warming: enough to make you sick

<http://www.latimes.com/news/science/environment/la-sci-disease25feb25,1,7922126.story?page=1&ctrack=1&csset=true&coll=la-news-environment> (free subscription required)

*Climate Change 2007: Impacts, Adaptation and Vulnerability*

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Stopping climate change is possible

[http://www.panda.org/news\\_facts/newsroom/index.cfm?uNewsID=100480](http://www.panda.org/news_facts/newsroom/index.cfm?uNewsID=100480)

Secretary-General Welcomes Report on Mitigation of Climate Change, Says Package on Way Forward Must Be Launched At Bali Conference

<http://www.un.org/News/Press/docs/2007/sgsm10976.doc.htm>

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<http://www.iisd.ca/climate/ipwg3>

Experts Meet on UN Report but Time Running Out

<http://www.planetark.com/dailynewsstory.cfm/newsid/41638/story.htm>

UN Climate Talks Down to Wire, EU and China Spar

<http://www.planetark.com/dailynewsstory.cfm/newsid/41708/story.htm>

Tackling climate change. A bargain. Economist.com, May 4th 2007

[http://www.economist.com/daily/news/displaystory.cfm?story\\_id=9135283&fsrc=nwl](http://www.economist.com/daily/news/displaystory.cfm?story_id=9135283&fsrc=nwl)

China seen as a roadblock to U.N. climate report. Beijing wants the U.S. and Europe to bear most of the blame and costs for controlling global warming.

By Alan Zarembo, Times Staff Writer, May 3, 2007

<http://www.latimes.com/news/printedition/asection/la-sci-warming3may03,1,3027774,full.story?ctrack=2&cset=true>

US Rejects 'High Cost' Global Warming Scenarios

<http://www.planetark.com/dailynewsstory.cfm/newsid/41726/story.htm>

*Restoring Nature's Capital: An Action Agenda to Sustain Ecosystem Services*

[http://www.wri.org/biodiv/pubs\\_description.cfm?pid=4309](http://www.wri.org/biodiv/pubs_description.cfm?pid=4309)

Restoring Nature's Capital: An Action Agenda to Sustain Ecosystem Services—WWICS session

[http://www.wilsoncenter.org/index.cfm?fuseaction=events.event&event\\_id=235464](http://www.wilsoncenter.org/index.cfm?fuseaction=events.event&event_id=235464) (video)

Chair's summary of the OECD Council at Ministerial Level, Paris, 15-16 May 2007 - Innovation: Advancing the OECD Agenda for Growth and Equity

[http://www.oecd.org/document/22/0,2340,en\\_2649\\_201185\\_38604566\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/22/0,2340,en_2649_201185_38604566_1_1_1_1,00.html)

UN Experts Near Deal on Climate After Disputes

<http://www.planetark.com/dailynewsstory.cfm/newsid/41284/story.htm>

Arctic Ice Retreating 30 Years Ahead of Projections

<http://www.ens-newswire.com/ens/apr2007/2007-04-30-04.asp>

Arctic sea ice decline: Faster than forecast (abstract)

<http://www.agu.org/pubs/crossref/2007.../2007GL029703.shtml>

Arctic melt worse than predictions

<http://www.cnn.com/2007/TECH/science/05/02/arctic.ice/index.html>

Rapid rise in global warming is forecast

<http://www.timesonline.co.uk/tol/news/uk/science/article1805870.ece>

Ocean Around Japan Warming Up Fast – Report

<http://www.planetark.com/dailynewsstory.cfm/newsid/41923/story.htm>

## **Greenhouse Gas on the Rise**

### *Military Implications:*

There is compelling evidence of the consequences of anthropogenic climate change, and a growing world demand for action. The military should continue to accelerate efforts to reduce their own greenhouse gas emissions. New international environmental security-related policies and cooperation to avoid potentially large-scale disasters and conflicts seem inevitable.

### *Sources:*

Scientists find new global warming threat from melting permafrost

[http://www.usatoday.com/tech/science/discoveries/2006-09-06-permafrost-warming\\_x.htm?POE=TECISVA](http://www.usatoday.com/tech/science/discoveries/2006-09-06-permafrost-warming_x.htm?POE=TECISVA)

Diary: Siberia and climate change

<http://news.bbc.co.uk/2/hi/science/nature/5323964.stm>

Science tempers fears on climate change

<http://www.theaustralian.news.com.au/story/0,20867,20332352-601,00.html> (article available free for a limited time)

## **China to Pass U.S. in CO2 Emissions this Year Making U.S. and China Target for Changing Climate Change Policies**

### *Military Implications:*

If a strategic partnership between the U.S. and China could be created to provide world leadership on climate change policy, then what role should their militaries play in such cooperation? This question should be put to relevant policy personnel, in order to be prepared for such an eventuality.

*Sources:*

Looking Forward: Sustaining the Earth and Humanity—Implications for the New UN Secretary-General

[http://www.wilsoncenter.org/index.cfm?topic\\_id=1411&fuseaction=topics.event\\_summary&event\\_id=218883](http://www.wilsoncenter.org/index.cfm?topic_id=1411&fuseaction=topics.event_summary&event_id=218883)

China seen topping U.S. carbon emissions in 2007

<http://www.alertnet.org/thenews/newsdesk/L22726612.htm>

## **NEW ORGANIZATIONS WITH MANDATES WITH EVENTUAL ES IMPLICATIONS**

### **Global Facility for Disaster Reduction and Recovery to Mitigate Impact of Natural Disasters**

*Military Implications*

This new entity provides one more point of coordination and information sharing for military disaster support planners.

*Sources:*

World Bank-ISDR partnership to promote resilience of nations and communities to disasters

<http://www.unisdr.org/eng/media-room/press-release/2006/pr-2006-10-WB-ISDR-partnership.pdf>

Global Facility for Disaster Reduction and Recovery

<http://www.unisdr.org/news/CFDRR-WB.doc>

Global Facility for Disaster Reduction and Recovery

<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/EXTDISMGMT/0,,contentMDK:21021166~menuPK:2848225~pagePK:210058~piPK:210062~theSitePK:341015,00.html>

Natural Disasters on the Rise, 2005 The Zenith Year

<http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21085895~pagePK:34370~piPK:34424~theSitePK:4607,00.html>

### **FAO Launched New Crisis Management Centre**

#### **WHO-sponsored pandemic flu task force holds first meeting in Geneva**

*Military Implications:*

The military should continue collaboration with these centers to strengthen military-to-military assistance and training in fighting pandemics, to become more globally integrated and for assisting in planning and performing emergency actions, if needed.

*Sources:*

New Crisis Management Centre launched by FAO

<http://www.fao.org/newsroom/en/news/2006/1000421/index.html>

WHO-sponsored pandemic flu task force holds first meeting in Geneva

[http://www.iht.com/articles/ap/2006/09/26/europe/EU\\_MED\\_UN\\_Pandemic\\_Task\\_Force.php](http://www.iht.com/articles/ap/2006/09/26/europe/EU_MED_UN_Pandemic_Task_Force.php)

## **UN Creates Secretariat of the Global Bioenergy Partnership at FAO**

### *Military Implications:*

Military personnel involved in biofuel R&D should seek appropriate liaison with the GBEP Secretariat to explore potentials for mutual collaboration, new equipment, and exchanging views and regulations regarding biofuels.

### *Sources:*

UN Efforts to Promote New “Green” Fuels Move Ahead

<http://www.un.org/apps/news/story.asp?NewsID=20002&Cr=FAO&Cr1=>

Global Bioenergy Partnership Secretariat up, running

<http://www.fao.org/newsroom/en/news/2006/1000405/index.html>

Redesigning Crops to Harvest Fuel

<http://www.nytimes.com/2006/09/08/business/08crop.html?ex=1159416000&en=b4b46ba4cfda7706&ei=5070> (by subscription only)

Global meltdown feared: UN report

<http://www.canada.com/vancouver/un/features/energy/story.html?id=62464470-b75f-4b26-8360-f17b9a8e5249>

Energy review ignores climate change 'tipping point'

<http://www.guardian.co.uk/science/story/0,1864802,00.html>

## **‘3R’—Reduce, Reuse and Recycle New Environmental Think Tank for Asia**

### *Military Implications:*

Environmental security military personnel with Asian regional responsibilities should liaise with this new think tank to share “best practices” and emerging environmental security issue information.

### *Source:*

Partnership Launched to Create '3R' Knowledge Hub in Bangkok

<http://unescap.org/unis/press/2006/aug/g33.asp>

## **Asian Consortium on Non-traditional Security Issues**

### *Military Implications:*

The military should consider attending the annual conference on non-traditional security issues. Relevant military personnel might also consider collaborating with the consortium in exploring how the capacity of the military can be best mobilized in tackling such “unconventional” threats. If the Army’s Emerging Non-traditional Security Issues (ENSI) Program still exists, that would be an appropriate linking mechanism.

### *Sources:*

Singapore to host consortium studying non-traditional security issues

<http://www.channelnewsasia.com/stories/singaporelocalnews/view/251242/1.html>

Bird flu, climate change among Asia's threats

<http://www.todayonline.com/articles/164675.asp>

## **UN StEP Initiative for Reducing E-Waste**

### *Military Implications:*

Relevant military personnel should follow the StEP developments to identify opportunities for international cooperation and to better anticipate potential new directives. This applies particularly to the Defense Reutilization and Marketing system, which sells and disposes of “excessed” electronic materiel for all Services.

*Sources:*

<http://www.step-initiative.org/index.php>

Formal Launch of StEP 2007-03-06

<http://www.step-initiative.org/news.php?id=63>

## **NEW INITIATIVES AIMING TO INCREASE ECO-EFFICIENCY**

### **Switching to Green: A renewable energy guide for office and retail companies**

*Military Implications:*

The military should make this available to those with responsibilities for increasing the use of renewable energy sources and promoting the Army Strategy on the Environment.

*Source:*

Switching to Green: A renewable energy guide for office and retail companies

[http://www.wri.org/climate/pubs\\_description.cfm?pid=4250](http://www.wri.org/climate/pubs_description.cfm?pid=4250)

### **Cleantech Report™ by Lux Research**

*Military Implications:*

Relevant military personnel should review Cleantech Report™ for information on technologies and trends that might have military implications and possibilities for implementing the Army Strategy on the Environment. [Definition note: cleantech seems to encompass technologies, products and procedures that are typically called “green”, meaning beneficial or less damaging to the environment than others in current or past use.]

*Source:*

The Cleantech Report™

<http://www.luxresearchinc.com/cleantech.php>

### **Idle Nighttime Computers Cited as Energy Wasters**

*Military Implications:*

Military installations should review their policies and operations and turn off all possible computers.

*Sources:*

Energy Awareness Campaign

<http://www.1e.com/energycampaign/index.aspx>

PC Energy Report Released Today Shows That Shutting Down Your PC at the End of the Work Day Will Have a Major Impact on Business Savings and Reducing CO<sub>2</sub>

<http://www.csrwire.com/News/8951.html>